Jet Thruster

DOCK YOUR
BOAT EASILY

Manufactured by
Holland Marine Parts B.V.

KEEP THIS MANUAL ONBOARD!

Installation manual & user guide

Jet Thruster Single & Combi

www.jetthruster.com

Jet Thrusters:
JT-30 / JT-50 / JT-70 / JT-90

02 (05 2015)

All our products are manufactured according to CE regulations.
We keep the rights to change descriptions, graphs or statements,
which are required for technical development of our Jet Thruster systems.

CE

HOLLAND MARINE PARTS
WE KEEP YOU MOVING!

Certification with added value

DUTCH CERTIFICATION INSTITUTE

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DCI Approved

Certificate of Conformity

Dutch Certification Institute, Notified Body for certification of Recreational Craft to the Directives 94/25/EC as amended by 2003/44/EC under number 0613 and established at Joure, the Netherlands, herewith declares that the under mentioned product has been assessed and meets all applicable essential safety requirements.

Manufacturer:	Holland Marine Parts Donker Duyvisweg 297 3316 BL Dordrecht (NL)
Product description:	Centrifugal pump based Thruster system for Bow and Stern

The enclosed list with essential documents of the Technical Documentation forms a whole with this certificate. This certificate remains valid as long as the product is up to the assessed prototype and follows the instructions: Correct use of the certificate.

Thus made and drawn up at Joure, the Netherlands, in good faith and to the best of knowledge.

Certificate number : CE - RCD- 1463
Date of Issue : 16th April 2015

Mrs. G.T. Hoekstra
Head of certification

DUTCH CERTIFICATION INSTITUTE

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Annex A
Essential Documents of the Technical Documentation

Date: 16th April 2015	Attachment of certificate: CE-RCD-1463

Elucidation of the certificate:

The under mentioned essential documents of the Technical Documentation have been assessed for compliance with the essential safety requirements regarding the design and the construction for building of recreational crafts, Annex I of the Recreational Craft Directives 94/25/EC and 2003/44/EC.

1. Verification documents:

Technical file: 1358.15

2. Test reports:

2.1	Test report:	SIQ Ljubljana
	Report number:	T251-0033/15
	Report date:	15th December 2014
2.2	Test report:	TÜV Rheinland
	Project number:	15020409.e01
	Report date:	27th March 2015

3. Product identification: The identification of the prototype is:

JT 30 - 12v , 3 kW
12v , 3.85

JT 50 - 12v , 6 kW
24v , 6 kW

JT 70 - 24v , 11 kW

JT 90 - 24v , 15.5 kW

including: hose clamps "Müllenbach" type 48-60 and 77-94

4. Applied standards:

EN 60204-1:2006
EN 60034: 2010
EN 61000-6-3: 2007 incl Amd. A1: 2011
EN 61000-6-4: 2007 incl. Amd. A1: 2011

Mrs. G.T. Hoekstra
Head of Certification

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Preface:

Holland Marine Parts keeps you moving!

Thank you very much for your purchase of the Jet Thruster.

The Jet Thruster system greatly simplifies the manoeuvering of your ship!

The extensive development process of the Jet Thruster guarantees a complete and innovative system that will make operating your boat a breeze!

The Jet Thruster systems by Holland Marine Parts are made of quality materials. For the correct and safe operation of the Jet Thruster you have purchased, we recommend having it professionally installed. A professional installation taking into account the recommendations in this installation / user manual guarantees a well-working system.

This installation manual has been prepared with the utmost care. If you experience installation trouble please contact your Jet Thruster dealer. We point out that some vessels require adjustments to assure their integrity. For all your questions about this please contact your shipbuilder.

Holland Marine Parts

Warranty provisions

On all its newly manufactured products Holland Marine Parts provides quality assurance regarding their proper operation, both with regard to the material and the work done, including latent defects, for a period of 24 months after the invoice date to the first receiver.

In case of defects in material and/or defects caused by inadequate work done, as covered under warranty by Holland Marine Parts, the relevant part or the whole device will be either repaired or replaced at the discretion Holland Marine Parts, free of charge.

The warranty periods specified in the first paragraph are not extended by the implementation of repairs under warranty.

Any costs associated with travel, transportation and installation and/or disassembly with regard to repairs covered under warranty will be borne by the owner of that device.

Damage to the product caused by improper installation, by intentional or unintentional misuse, lack of maintenance, normal wear and/or repair by third parties without the written permission of Holland Marine Parts are not covered by warranty.

Holland Marine Parts shall under no circumstances be liable for any consequential damages of any nature whatsoever or howsoever caused by the part or the whole product covered by warranty by Holland Marine Parts.

Please note: Exclusion of warranty: The pump head of the pump unit and the seals on the 3-way valve are tested to be waterproof. If they are opened/removed/damaged this will void all liability towards Holland Marine Parts in the occurrence of damage as a result of these actions.

This is the safety alert symbol. It is used to alert you to potential hazards. Obey all safety messages that follow this symbol to avoid possible injury, damage. This Installation Manual and User Guide provides advice and instructions towards the mechanical and electrical installation of the Jet Thruster system. Remember: Always use common sense when installing, using and servicing the Jet Thruster and it's components. In case anything is not clear: Contact your dealer or Holland Marine Parts BV for assistance.

In this manual the installation of the JT-30, JT-50, JT-70 and JT-90 in Single and Combi setup is explained.
Choose the installation procedure that applies to the system you have purchased.

Damage to system components due to Galvanic corrosion, Electrochemical corrosion and Stray current corrosion are excluded from warranty. Install cathodic protection as advised in this manual.

Read prior to operating the Jet thruster system

Your vessel is equipped with a Holland Marine Parts electric Jet Thruster. For the safe and correct operation of this system Holland Marine Parts recommends every user to carefully study this operating guide. Familiarise yourself with the system by trying it out in various weather conditions. The windage and draught as well as the weight of your vessel are factors contributing to how well the system operates.

Warnings:

- The Jet Thruster is not a replacement of the main controls but assists with the execution of difficult manoeuvres.
- Familiarise yourself with the way your vessel responds to your operation of the system.
- The electric motor produces heat. The thermal protection limits continuous operation.
- The water inlet is located on the bottom of your vessel. Inquire about the exact location of the water inlet grating.
- Prevent the system from sucking in large amounts of sand and dirt. Do not activate it when you have less than 30cm (12”) of ground clearance.
- The nozzles of the Jet Thruster are located beneath the water line. Do not activate the system and do not operate the Jet Thruster when there are people, animals or vulnerable items in the vicinity of your vessel and the inlet and orifices.
- Close all the valves when you are not aboard. Inquire about the local regulations in ports with regard to closing the valves.

Engage the Jet Thruster in pulses of maximum 10 seconds.
Do not continuous run the Jet Thruster system: it is designed to operate in pulses.

Operation:

Make sure all valves are open before the system is activated. You operate the Jet Thruster by activating the system on the front plate of the control panel by pressing the button (A). This switch is illuminated in blue when the system is active. Operate the Jet Thruster by moving the joystick(s) (B) left or right, moving the bow or stern to port or starboard, respectively. When equipped with push buttons, the same procedure applies, the push buttons being illuminated in green or red light.

Duration of activation:

Move your vessel by means of pulses that last a maximum of 10 seconds. The efficiency of the system is determined in part by the battery capacity present. The overheating protection will activate when the system is active for an extended period of time. After the engine has cooled sufficiently this protection is removed. The cooling time is determined in part by the ambient temperature.

Jet Thruster Combi:

The control panel is equipped with two joysticks or push buttons. You can move sideways by operating both push buttons for bow and stern at the same time. You can manoeuvre the vessel around the centre of rotation by manoeuvring the bow to port and the stern to starboard, or the other way around.

Safety and operating recommendations.

Follow all instructions in this manual. All installers and users of the system must be aware of the mandatory safety regulations as explained in this manual:

- In rare conditions it might be possible that the pump unit of the Jet Thruster does not prime. If you notice a high rpm from the pump unit and no thrust force, do not attempt to prime the pump unit by continuous activating the system. In this situation the Electrical air valve from Holland Marine Parts should be installed to release the air from the pump head. This will prime the pump. **Do not run the pump unit without the presence of water!**
- Engage the Jet Thruster in pulses of maximum 10 seconds.
- Leave maintenance of the system to qualified technicians.
- Do not touch any moving parts of an active system.
- Parts such as the DC pump motor may become hot: do not touch them and do not cover them under any circumstances.
- Avoid having flammable products near the DC pump motor.
- Do not conduct any inspection or maintenance of the system when it is active or activated.
- Do not close any valves of an active system.
- The system is located beneath the water line. Do not remove any parts of the system before all valves have been closed.
- Close all valves when you are not aboard.
- Leave system maintenance to specialists.
- Disconnect the battery cables when conducting maintenance and in the event of long-term absence (e.g. when the vessel is not being used in winter).
- Protect the high-pressure hoses from heat / penetration / sunlight / chemicals /chafing. Check on regular basis.
- Avoid physical contact with the water inlet when the system is active.
- Avoid physical contact (swimmers!) with the nozzles and the water expelled by an active system.
- Keep system components dry. Protect system components from contact with (sea) water, humidity.
- Conduct inspections as stipulated in this manual towards the overall integrity of the components on regular basis.
- Check and replace protective anodes on anual basis.
- Annualy check if all battery cable connections are tightened securely.

Important:

Protect your Jet Thruster system from corrosion:

Sea- or brackish water, even polluted fresh water conducts electricity very well. Stainless steel can suffer from corrosion (pitting/crevice corrosion) when there is a lack of oxygen to restore the protective film that gives the stainless steel its natural protection:

Takes these following recommendations into account to assure corrosion is discovered, detected, removed, and prevented.

- Do not paint the stainless steel surfaces of the water intake and nozzle flanges present on the outside of the hull
- Remove barnacles, marine- and all other possible fouling from stainless steel surfaces as soon as possible, when present.
- Do not use steel tools (other than stainless steel) or steel wool when cleaning any stainless steel surface. Use Scotchbrite.
- Connect all stainless steel parts to a sacrificial anode, follow recommendations in this manual.
- Do not paint Anodes.
- When using copper- or tin-based anti-fouling (if not prohibited by local law) electrical interconnection must be avoided between the Stainless steel Jet Thruster components and the anodic blocks. Make sure to keep 40mm unpainted area around these items.
- If you use shore power, you should have an approved galvanic isolator or separator installed to protect against Stray Current Corrosion (electrolysis) from your dock.
- Your particular boating environment may require that you install additional anodes or other protective devices
- Corrosion is often induced by certain types of bacteria present in the water (world wide) and leaking electricity from false- or damaged electrical equipment. (Stray current)
- Galvanic or electrochemical corrosion to your stainless steel Jet Thruster components is minimized with a sacrificial anode if correct connected.
- Corrosion can be caused by many factors, such as wrong type or improper application of anti-fouling paint, marine growth, stray electrical current (electrolysis)
- **Why are unpainted flanges of the water inlet and nozzles rusty?**
- Stainless steel can discolor and form areas of light rust. Brushed finished stainless steel surfaces are more susceptible than brightly finished stainless steel. Rust stains can occur from polluted water, galvanic corrosion from the boat or marina, or from oxygen depletion. The stainless steel surfaces can be easily cleaned with rubbing compound or Scotchbrite. DO NOT USE STEEL WOOL. After cleaning use chrome polish to protect the finish. Stainless steel surfaces can also turn white from calcium or lime in the water. In this case clean the stainless steel surface with household mineral bath and tile cleaner.
- Important: Never use Steel Wool or any other metal parts or tools on the stainless steel Jet Thruster parts and surfaces. Do not grind or weld near stainless steel parts.
- Always avoid contact between stainless steel parts and other metal parts to avoid rust, or other types of corrosion to the stainless steel.
- Be vigilant for signs of corrosion and act if noticed to avoid (further) damage or dangerous situations.

Winterising:

Preferably have the system winterised by a specialist.

Please note: *Frost can do a lot of damage if you fail to drain the system. Use a compressor to remove the water present in the system by means of air pressure.*

Please note: *Excessive pressure may damage the system. Check the operating pressure you use to pressurise the system with. This operating pressure must not exceed 2 bar (30 psi).*

Step 1: Disconnect the + cable from the battery.

Step 2: Close all valves.

Step 3: Remove the blind plug or air valve in the outlet (A) of the pumpunit.

Step 4: Screw a compressed-air nipple in the outlet.

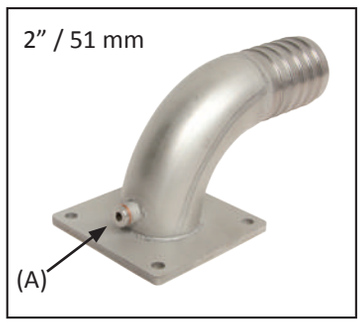
Step 5: Pressurise the system. **MAX 2 BAR (30 psi)!**

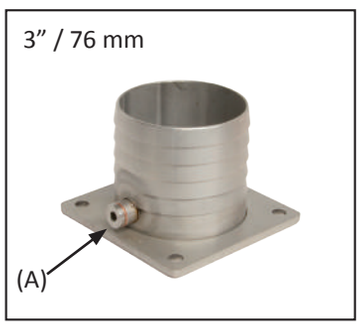
Step 6: Open the ball valves one by one and close them the instant you hear a bubbling sound. Repeat this procedure for every ball valve.

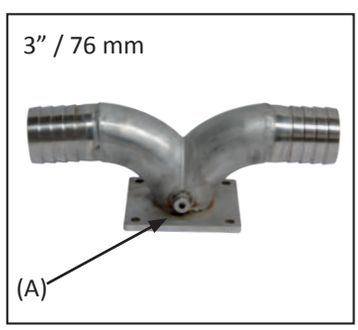
Step 7: Remove the compressed-air nipple.

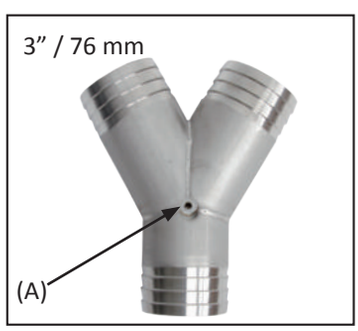
Step 8: Replace the blind plug or airvalve.

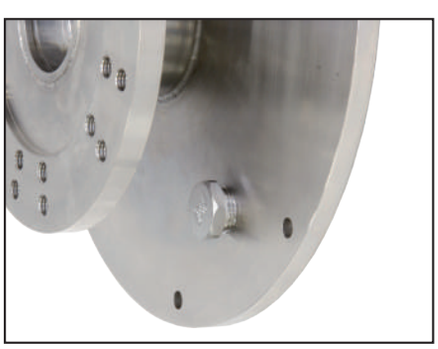
In addition you can drain the pumphouse, therefore remove draining plug for draining the pumphouse.











JT-30 / JT-50

JT-70 / JT-90

Troubleshooting:

If the system is not functioning:

	Problem	Cause	Solution
1.1	System is not working (power indicator off)	Joystick not receiving power	Press the switch
1.2	System is not working (power indicator off)	Joystick not receiving power	Check fuse 15A behind joystick
2.1	System is not working (power indicator on)	Battery dead or main fuse broken	Check / replace fuse
2.2	System is not working (power indicator on)	Overheating protection activated Damaged relay	Leave engine to cool Contact your dealer
3.1	Engine running, no activity	Valves closed	Check whether or not valves are closed
3.2	Engine running, no activity	Engine does not draw water	Place pump unit inlet below water line
3.3	Engine running, no activity	Polluted system (shallow water)	Run engine in deep water until clean
3.4	Engine running, no activity	Damaged impeller	Contact your dealer
4.1	Engine running, no activity	System operates inverted	Cabling fault Exchange A and B on the pump unit
4.2	System is not efficient enough	Low battery voltage	Charge batteries, Check actual voltage at meter.
4.3	Not enough power (JT-50 24V, JT-70 and JT-90)	Series-parallel does not activate, system runs at 12V	Check connections series-parallel switch

Installation & maintenance

YouTube

watch our installation video's!

www.youtube.com/user/hollandmarineparts

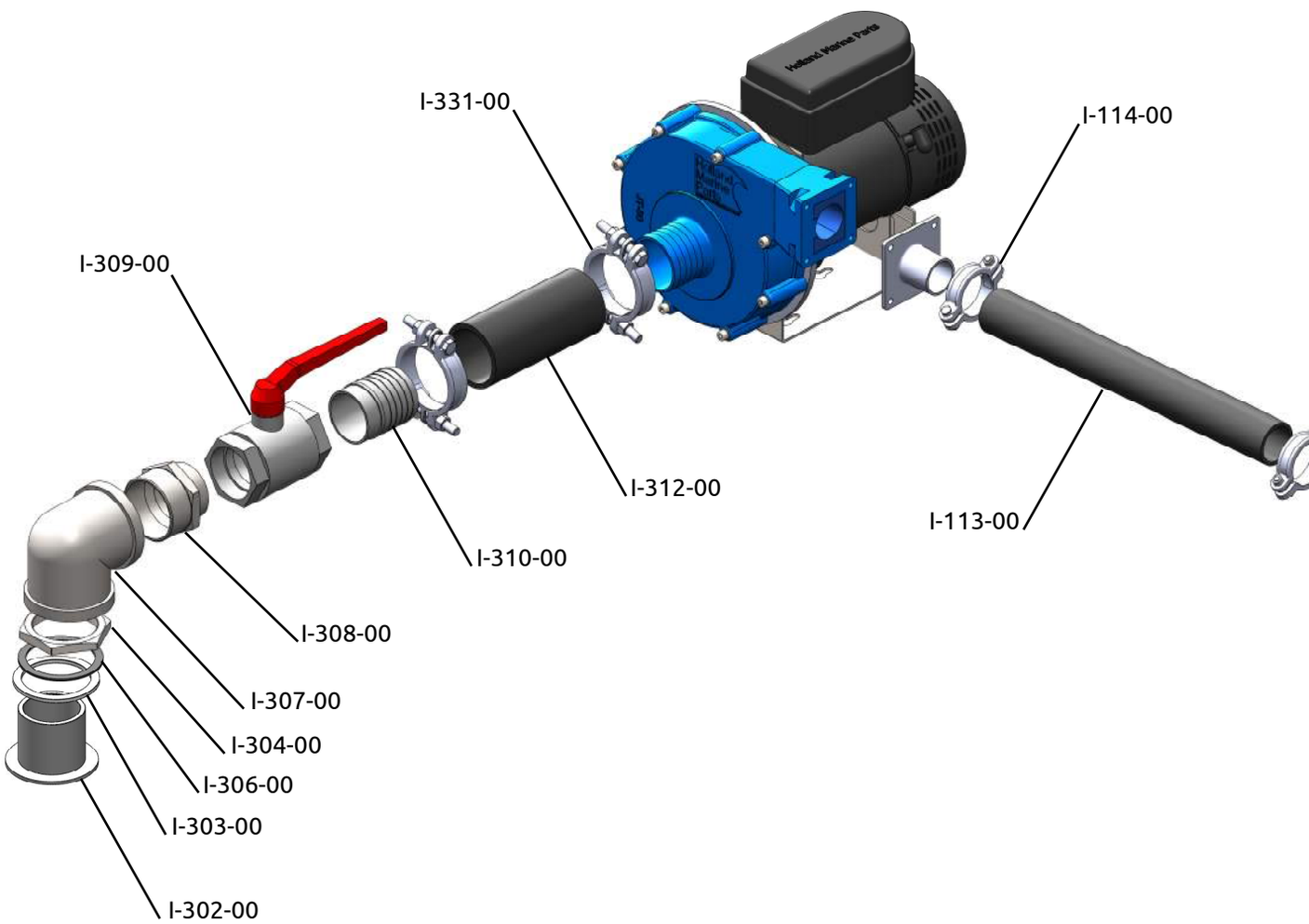
Safety and installation recommendations:

Read prior to installation!

Follow all instructions in this manual. All installers and users of the system must be aware of the mandatory safety regulations as explained in this manual:

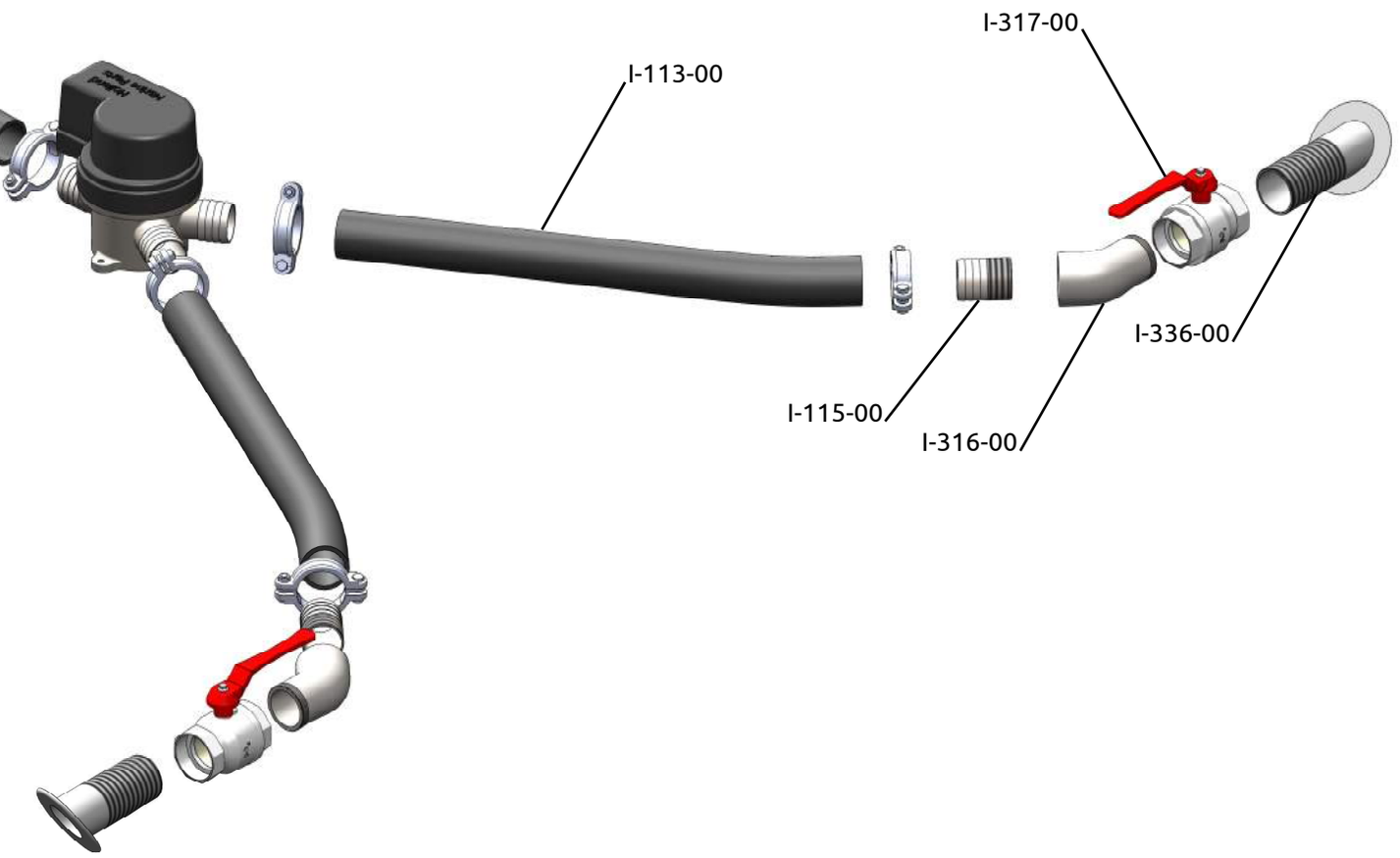
- In rare conditions it might be possible that the pump unit of the Jet Thruster does not prime. If you notice a high rpm from the pump unit and no thrust force, do not attempt to prime the pump unit by continuous activating the system. In this situation the Electrical air valve from Holland Marine Parts should be installed to release the air from the pump head. This will prime the pump. **Do not run the pump unit without the presence of water!**
- Use appropriate tools for the installation and maintenance of the Jet Thruster.
- Provide the Jet Thruster seperate battery(s). **Place the battery(s) as close to the pump unit of the Jet Thruster as possible.**
- Always use a Holland Marine Parts control panel.
- Do not touch any moving parts of an active system.
- Parts such as the DC pump motor may become hot: do not touch them and do not cover them under any circumstances.
- Avoid having flammable products near the DC pump motor.
- Do not conduct any inspection or maintenance of the system when it is active or activated.
- Do not close any valves of an active system.
- The system is located beneath the water line. Do not remove any parts of the system before all valves have been closed.
- Close all valves when you are not aboard.
- Disconnect the battery cables when conducting maintenance and in the event of long-term absence (e.g. when the vessel is not being used in winter).
- The hoses are under pressure in an active system: high-pressure hoses are to be attached to the vessel to prevent movement along e.g. sharp edges.
- Protect the high-pressure hoses from heat / penetration / sunlight / chemicals /chafing.
- Avoid physical contact with the water inlet when the system is active.
- Danger! Protect pump unit and 3-way valve from petrol fumes.
  Provide sufficient ventilation. Ignition proof covers are available.
- Keep system components dry. Protect system components from contact with (sea) water, humidity.
- Connect Sacrificial anodes as explained in this manual to all sections of the Jet Thruster system to reduce the effects of pitting and crevice corrosion to stainless steel parts

Exploded View Jet Thruster JT-30/50 Single

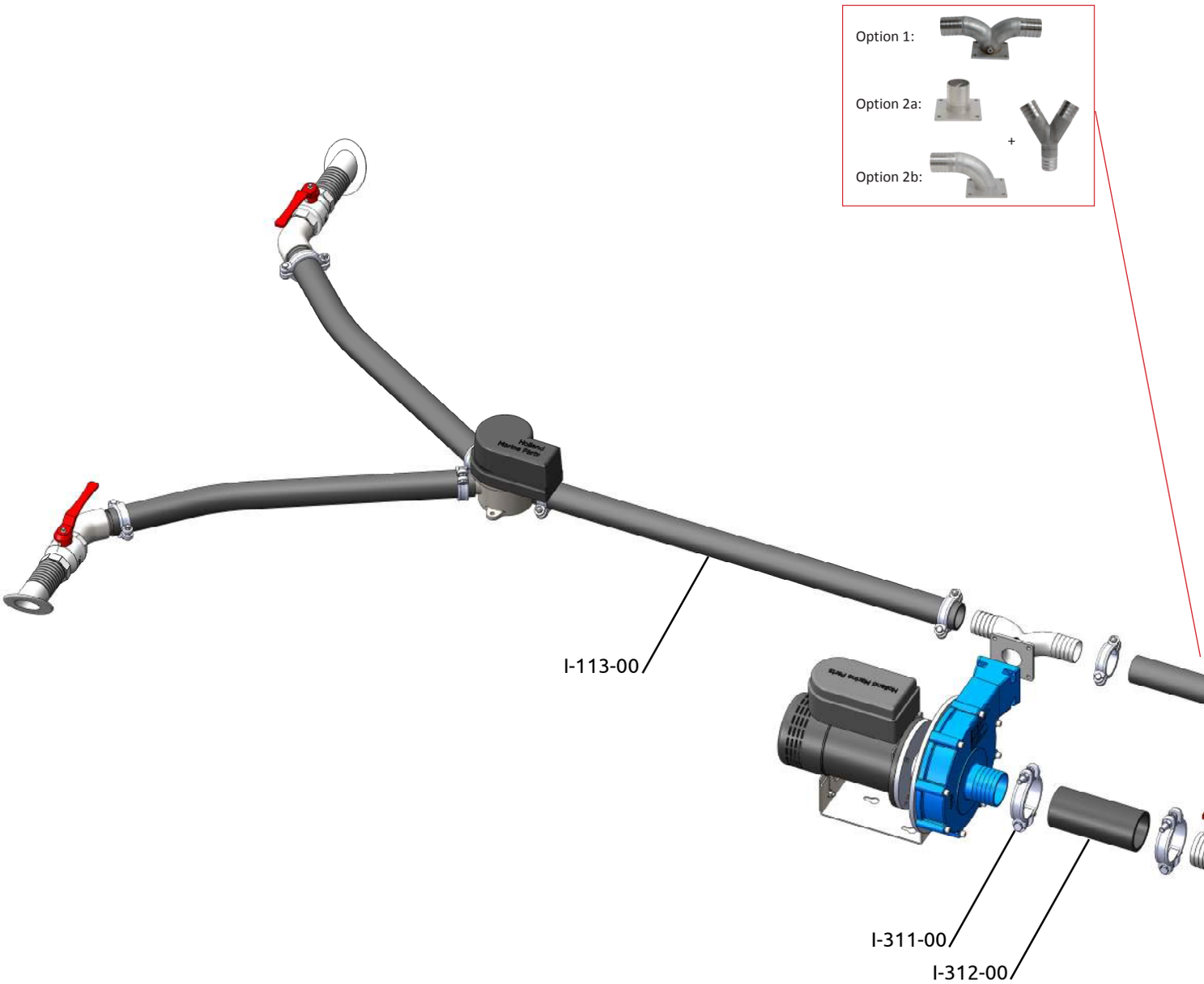


Pumpunit JT-30 / JT-50	JT-30-00 / JT-50-00
3-Way valve	V-100-00

Water inlet	I-302-00	Hose clamp 77-94 mm	I-331-00
Ring 3”	I-303-00	Hose 3”/76 mm / L=1m/3.3 ft	I-312-00
Nut 3”	I-304-00	Pressure hose 2” / 51 mm	I-113-00
Seal Rubber	I-306-00	Hose clamp 48-60 mm	I-114-00
Elbow 90^0 3” BSP	I-307-00	Elbow 45^0 2” BSP M/F	I-316-00
Reducer 3” BSP / 2,5” BSP	I-308-00	Hose connector 2” / 51 mm	I-115-00
Ball valve 2,5” BSP	I-309-00	Ball valve 2” BSP	I-317-00
Hose connector 2,5” / 76 mm	I-310-00	Nozzles	I-336-00

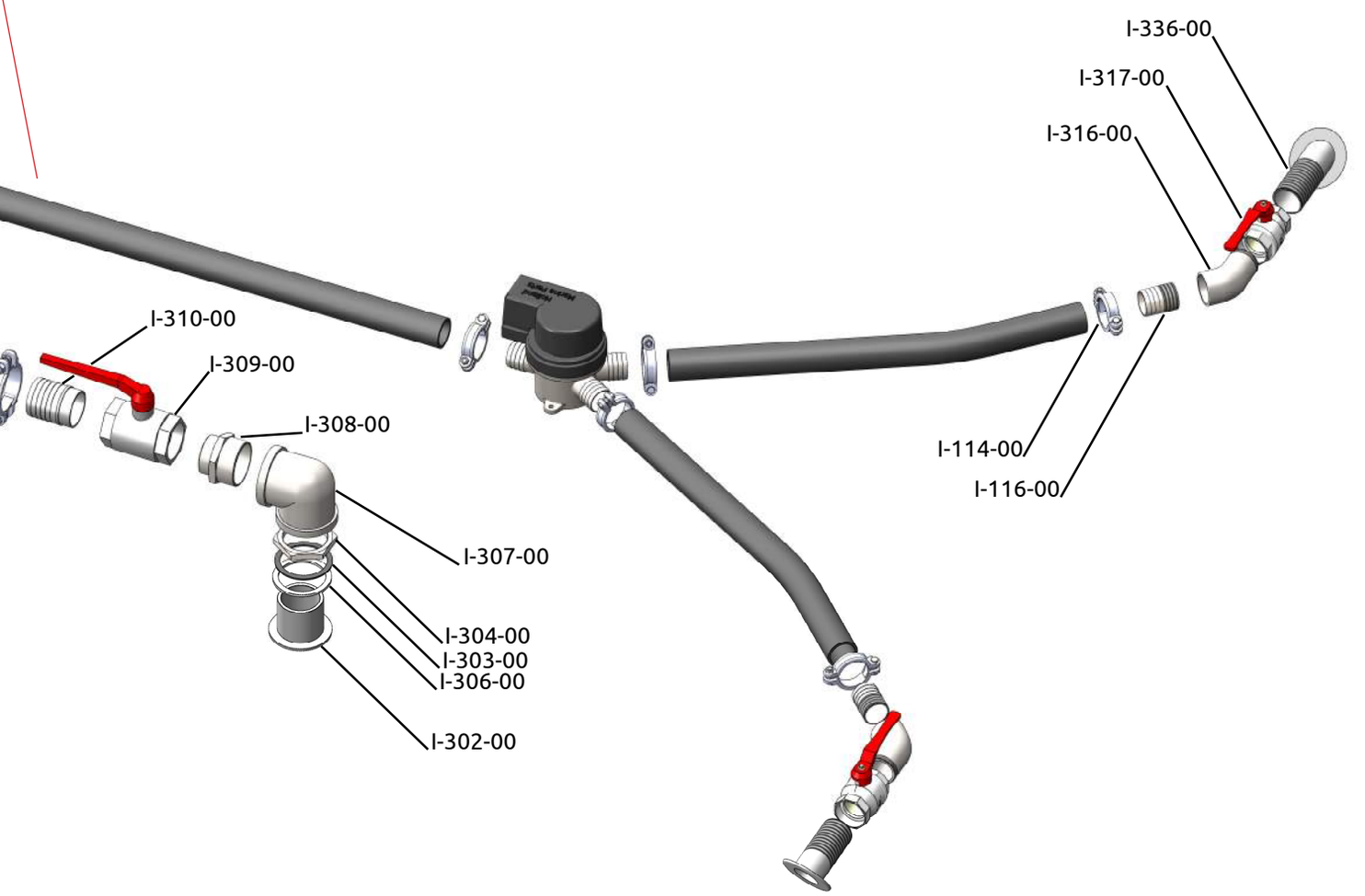


Exploded View Jet Thruster JT-30/50 Combi



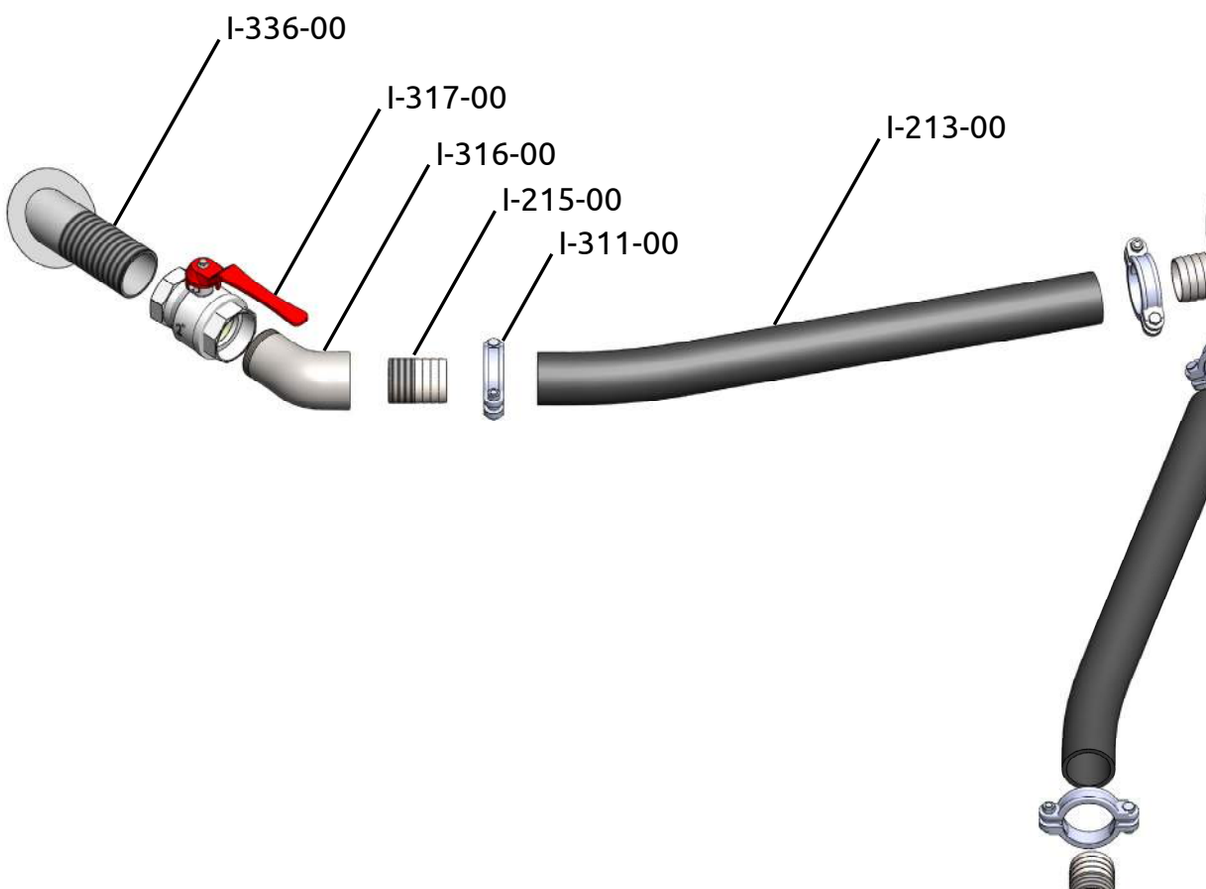
Pumpunit JT-30 / JT-50	JTS-30-00 / JTS-50-00
2-Way pump outlet	P-155-00
3-Way valve	V-101-00

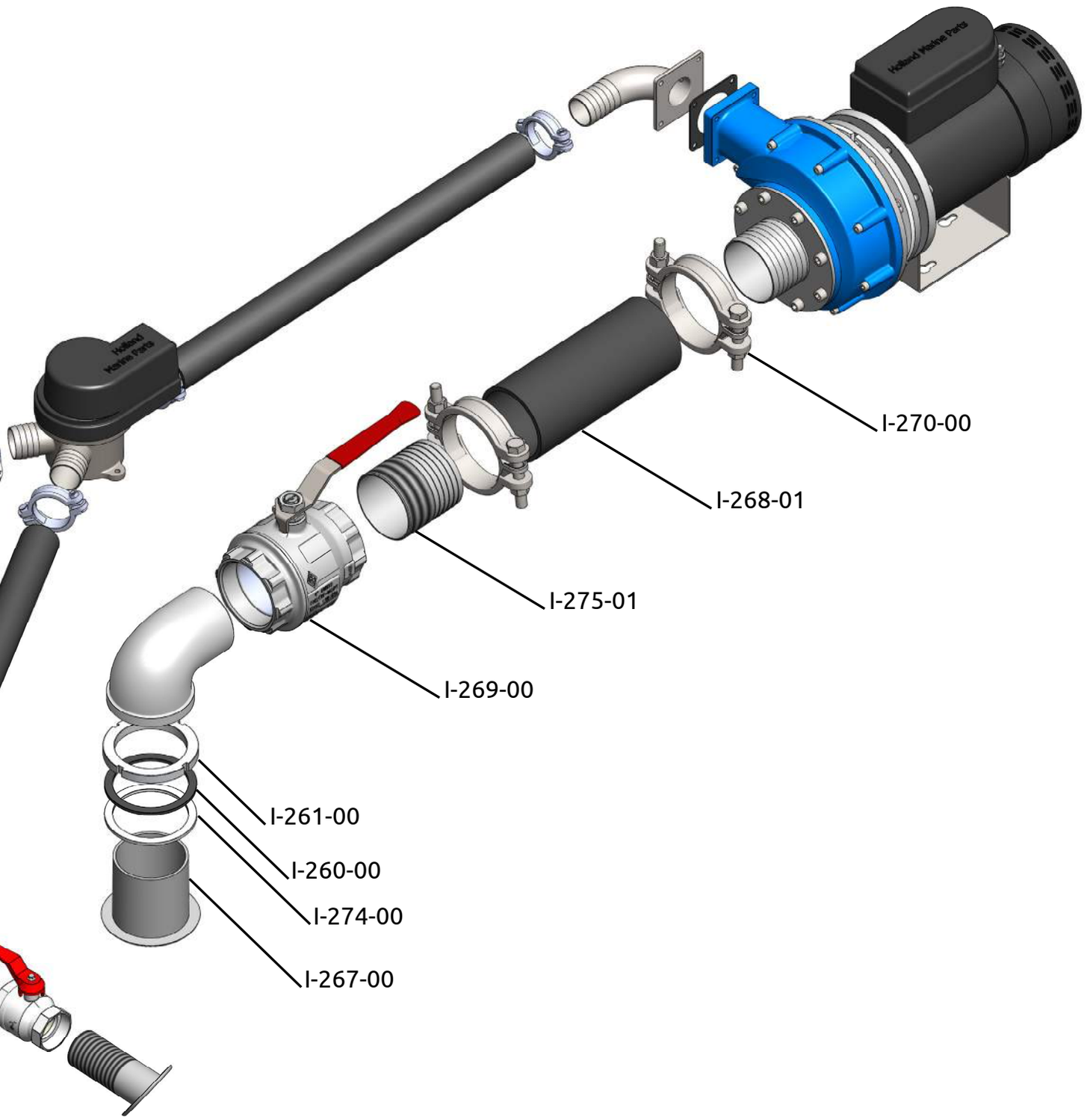
Water inlet 3”	I-302-00	Hose clamp 77-94 mm	I-311-00
Ring 3”	I-303-00	Hose 3”/76 mm / L=1m/3.3ft	I-312-00
Nut 3”	I-304-00	Pressure hose 2” / 51 mm	I-113-00
Seal Rubber	I-306-00	Hose clamp 48-60 mm	I-114-00
Elbow 90^0 3” BSP	I-307-00	Elbow 45^0 2” BSP M/F	I-316-00
Reducer 3” BSP /2,5” BSP	I-308-00	Hose connector 2” / 51 mm	I-115-00
Ball valve 2,5” BSP	I-309-00	Ball valve 2” BSP	I-317-00
Hose connector 2,5” / 76 mm	I-310-00	Nozzles	I-336-00



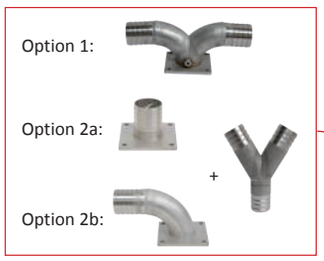
Exploded View Jet Thruster JT-70/90 Single

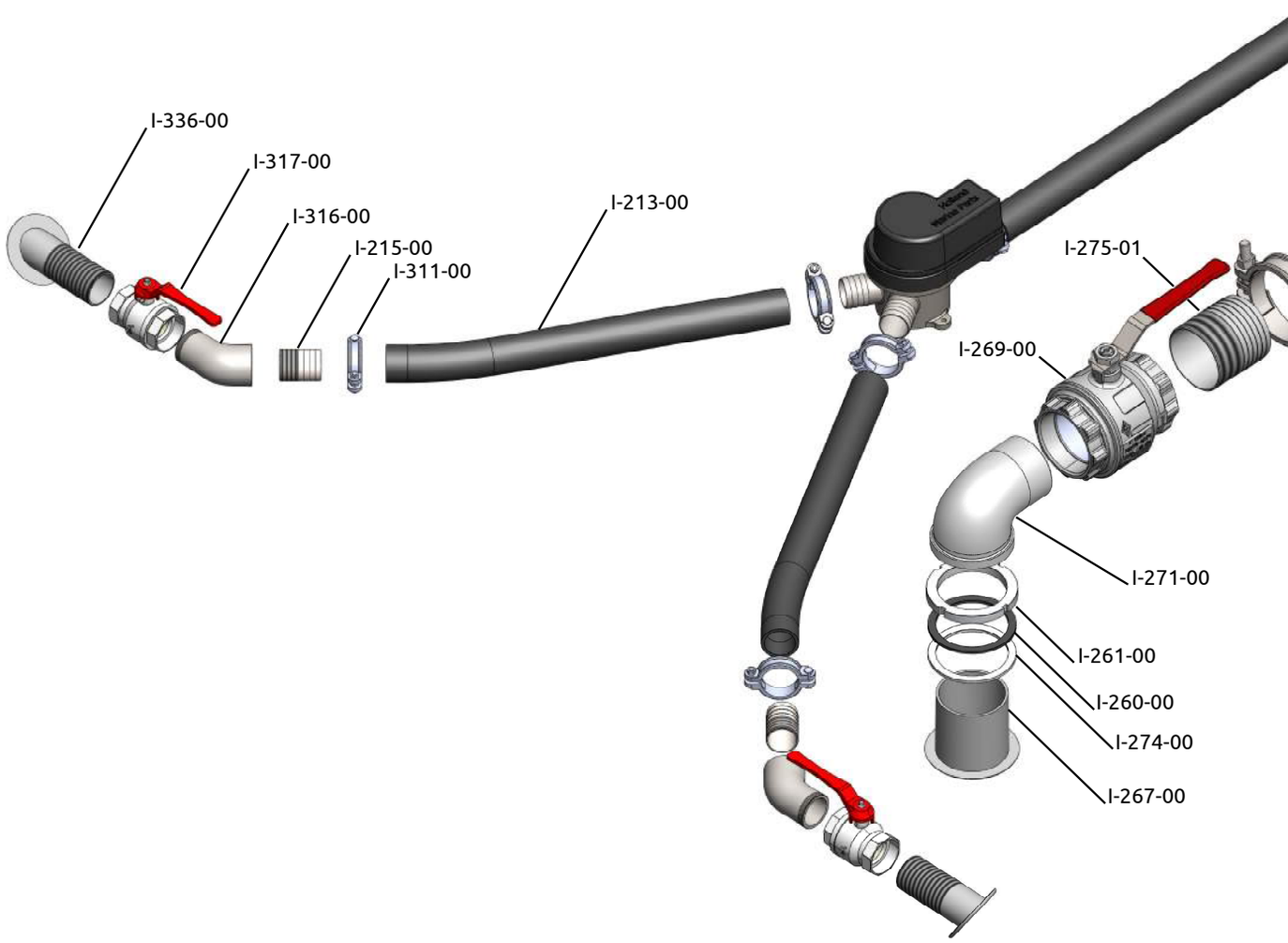
Pumpunit JT-90	JTS-90-00
3-Way valve	V-200-00
Water inlet 4”	I-267-00
Ring 4”	I-260-00
Nut 4”	I-261-00
Seal Rubber 4”	I-274-00
Elbow 90^0 BSP	I-271-00
Ball valve 4” BSP	I-269-00
Hose connector 110 mm	I-275-01
Hose clamp 77-94 mm	I-331-00
Hose clamp 115-145 mm	I-270-00
Hose 110 mm / L=1m/3.3ft	I-268-01
Pressure hose 3” / 76 mm	I-213-00
Elbow 45^0 2” BSP M/F	I-316-00
Hose connector 3”/76 mm / 2” BSP	I-215-00
Ball valve 2” BSP	I-317-00
Nozzles	I-336-00

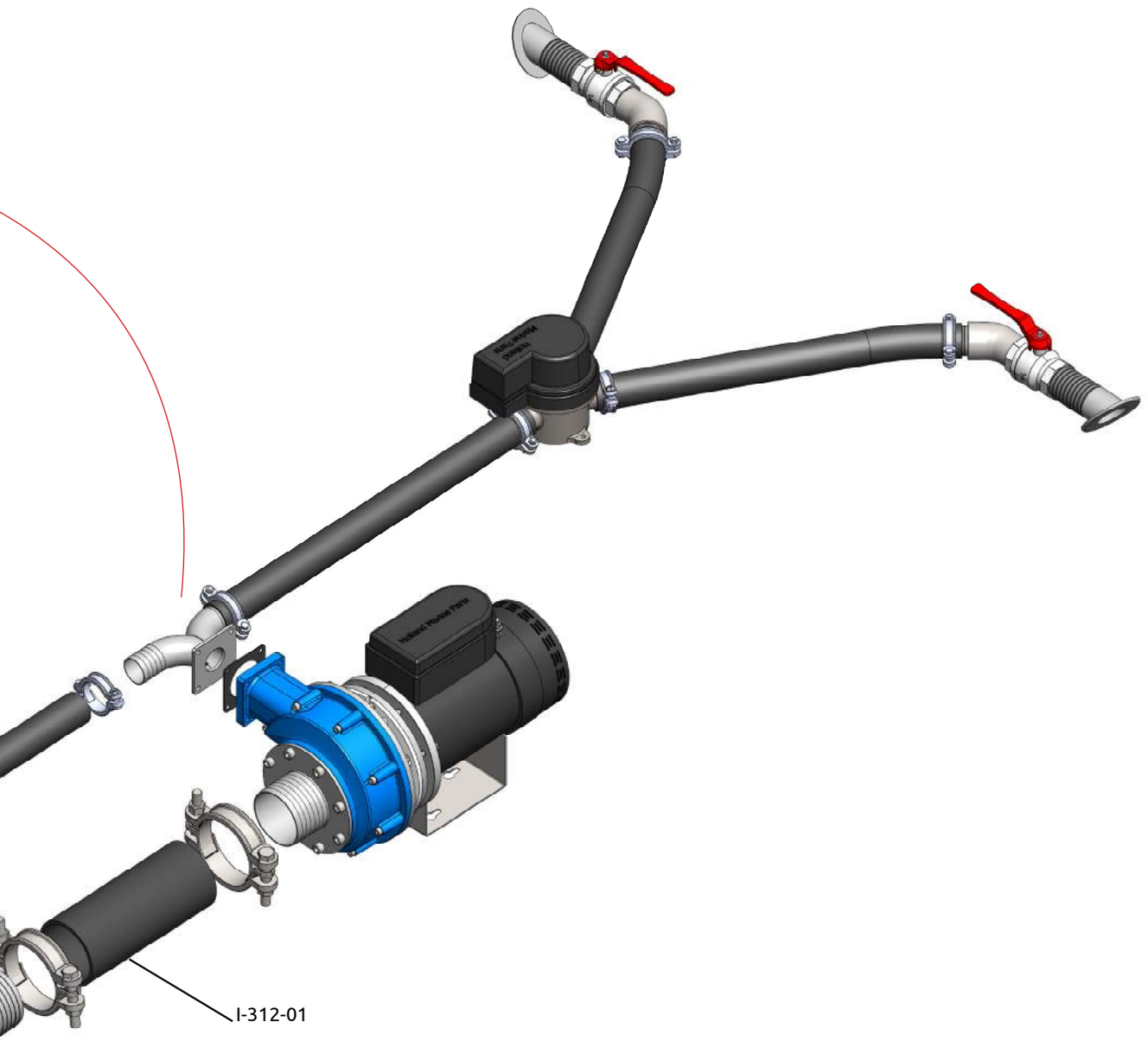



I-270-00
I-268-01
I-275-01
I-269-00
I-261-00
I-260-00
I-274-00
I-267-00

Exploded View Jet Thruster JT-70/90 Combi







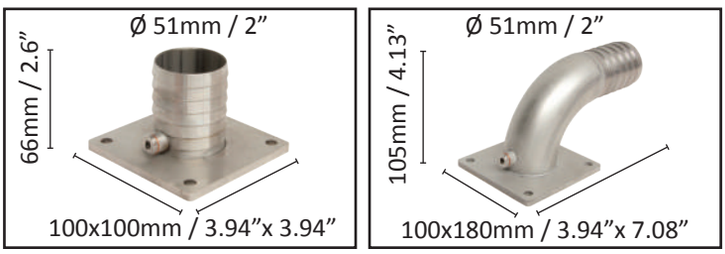
Pumpunit JT-90	JTC-90-00
2-Way pump outlet	P-259-00
3-Way valve	V-202-00

Water inlet 4”	I-267-00
Ring 4”	I-260-00
Nut 4”	I-261-00
Seal Rubber 4”	I-274-00
Elbow 90^0 3” BSP	I-271-00
Ball valve 4” BSP	I-269-00
Hose connector 110 mm	I-275-01

Hose clamp 77-94 mm	I-331-00
Hose clamp 115-145 mm	I-270-00
Hose 110 mm / L=1m/3.3ft	I-268-01
Pressure hose 3” / 76 mm	I-213-00
Elbow 45^0 2” BSP M/F	I-316-00
Hose connector 3”/76 mm / 2” BSP	I-215-00
Ball valve 2” BSP	I-317-00
Nozzles (steel)	I-336-00

Technical Specifications JT-30

Pump head in position I

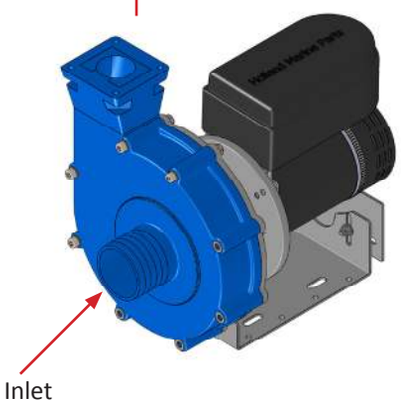


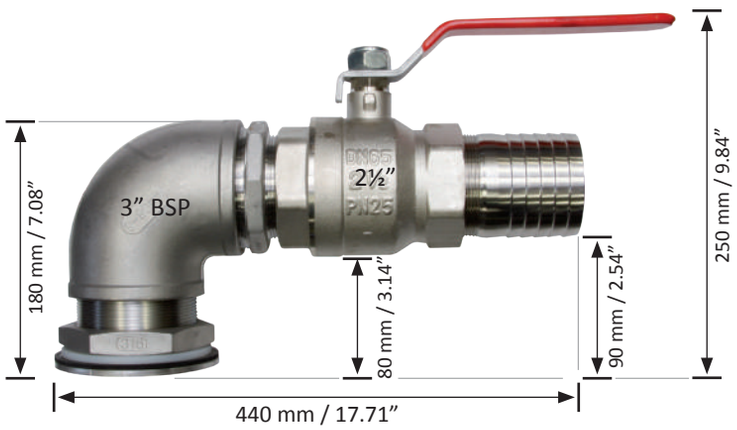
P-142-00: Straight pump outlet

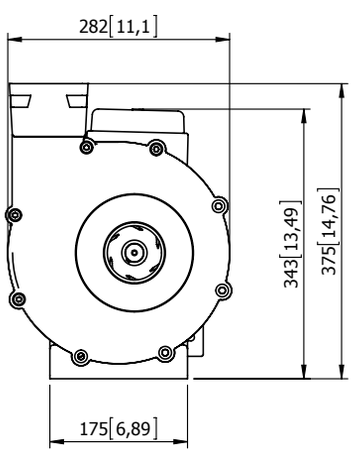
P-122-00: 90⁰ pump outlet

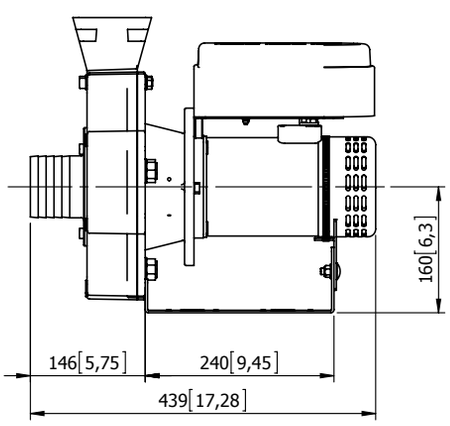
2 options for hose connector on pump outlet:

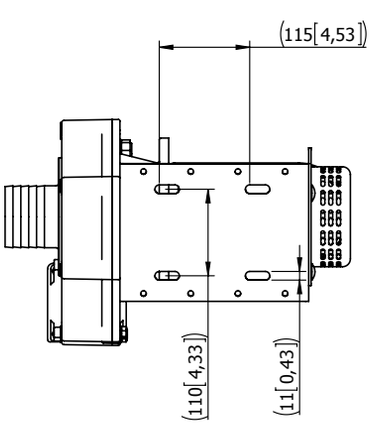
Water inlet assembly:
Connect with flexible hose to inlet on pump unit. Max. hose length 1 m / 3.3 ft

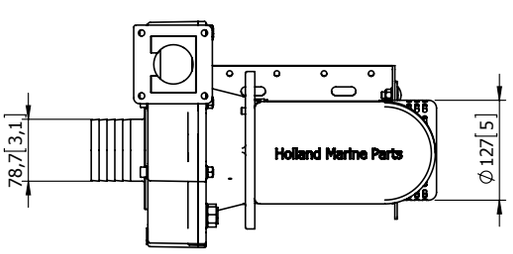




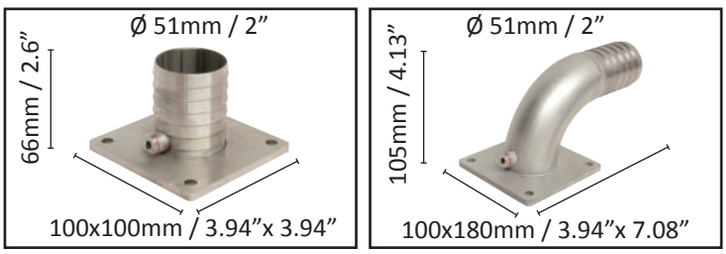








Technical Specifications JT-30
Pump head in position II

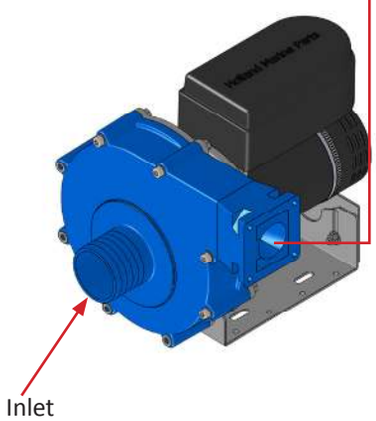


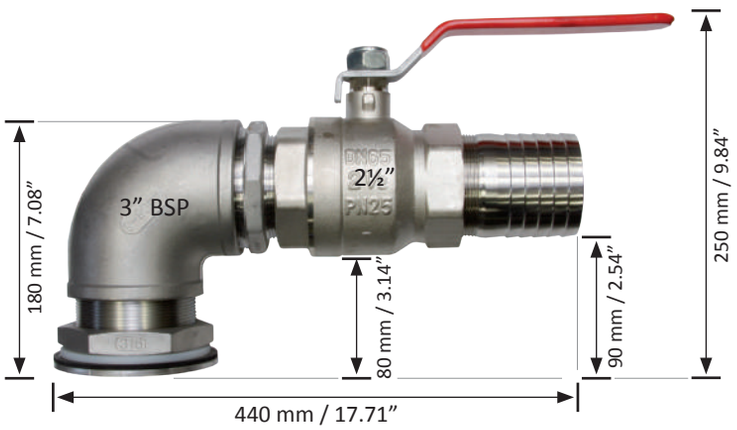
P-142-00: Straight pump outlet

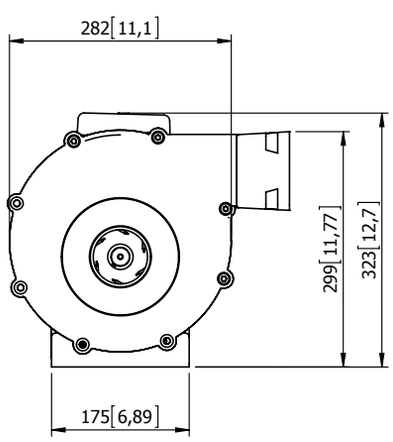
P-122-00: 90^0 pump outlet

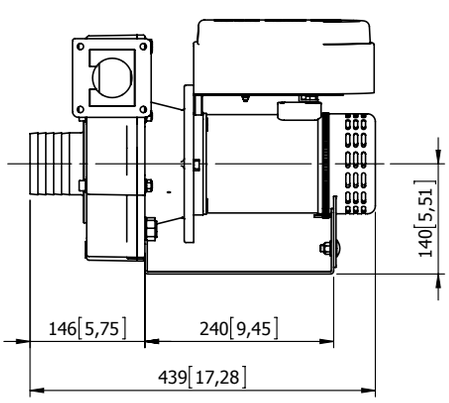
2 options for hose connector on pump outlet:

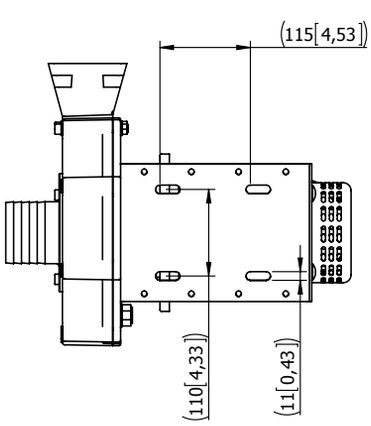
Water inlet assembly:
Connect with flexible hose to inlet on pump unit. Max. hose length 1 m / 3.3 ft

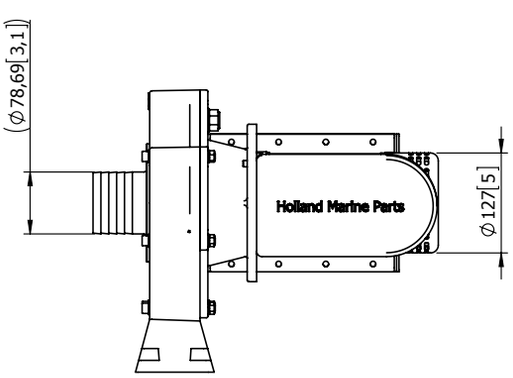






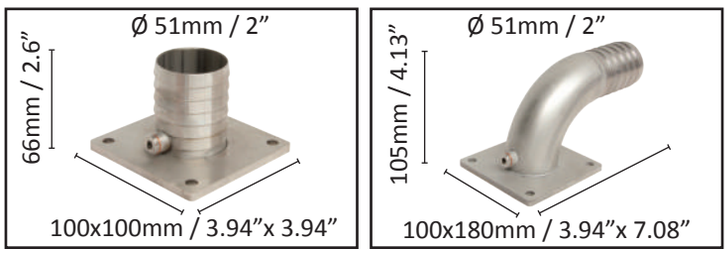






Technical Specifications JT-50

Pump head in position I

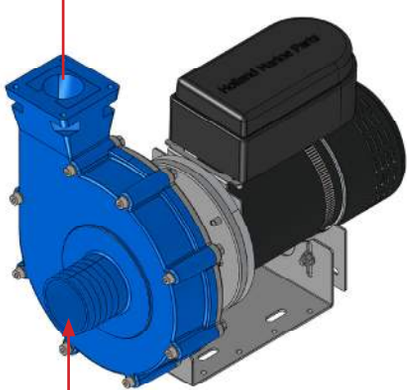


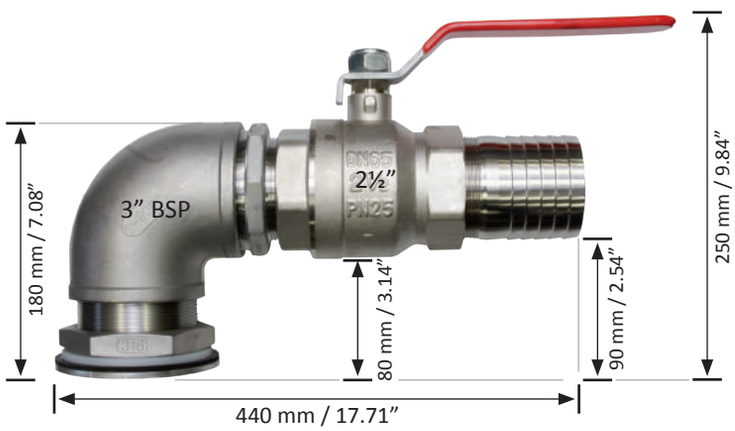
P-142-00: Straight pump outlet

P-122-00: 90^0 pump outlet

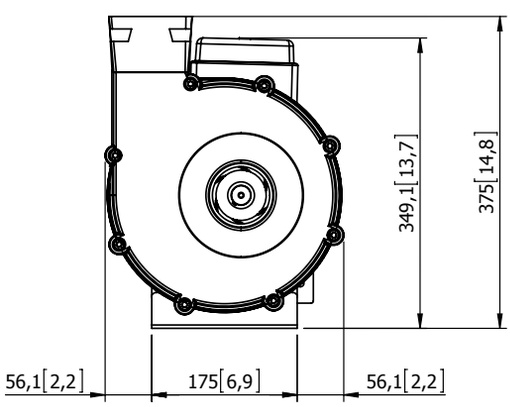
Water inlet assembly:
Connect with flexible hose to inlet on pump unit. Max. hose length 1 m / 3.3 ft

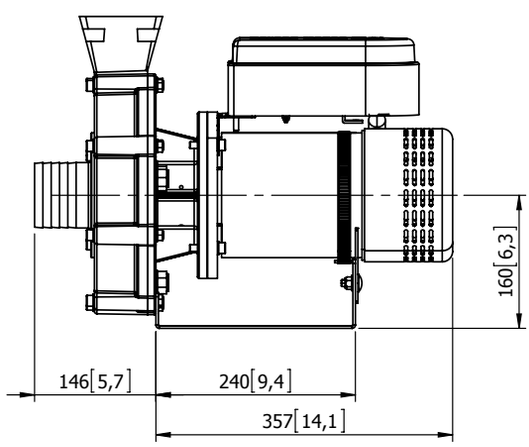
2 options for hose connector on pump outlet:

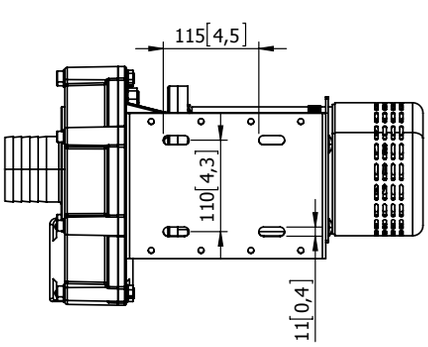


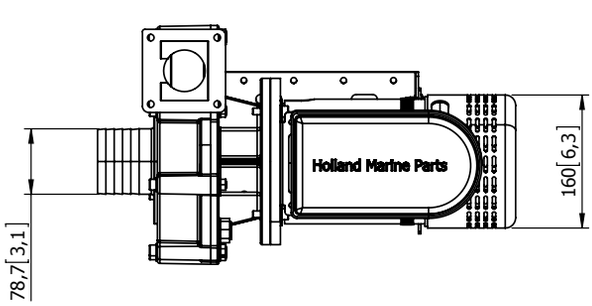


Inlet



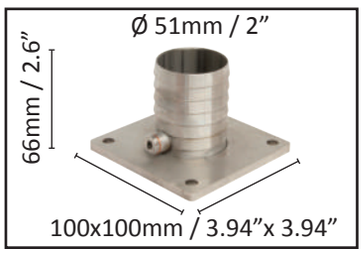




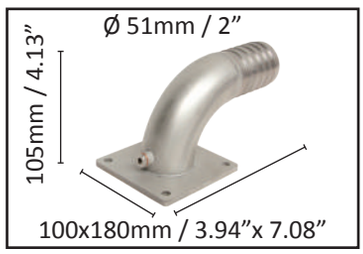


Technical Specifications JT-50

Pump head in position II



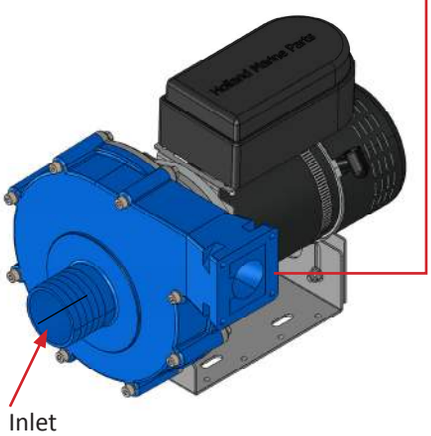
P-142-00: Straight pump outlet

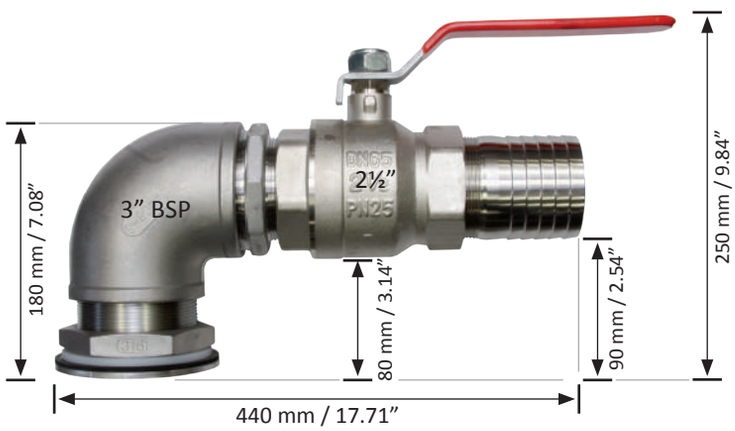


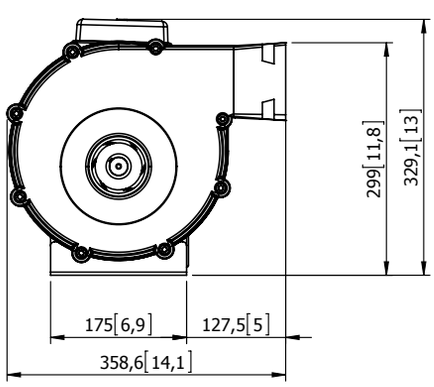
P-122-00: 90^0 pump outlet

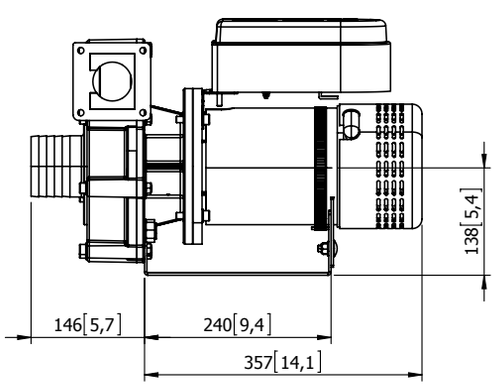
Water inlet assembly:
Connect with flexible hose to inlet on pump unit. Max. hose length 1 m / 3.3 ft

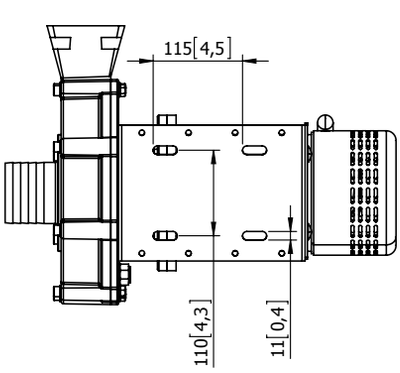
2 options for hose connector on pump outlet:

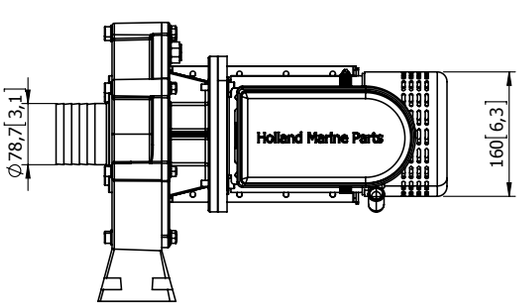






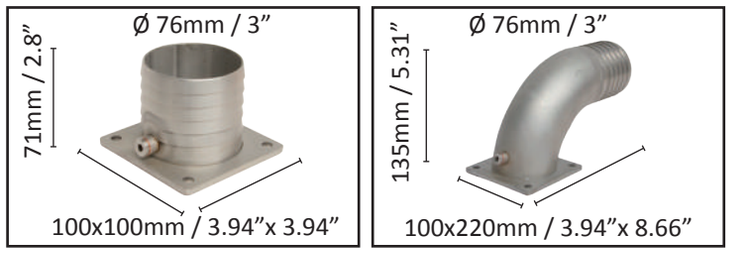






Technical Specifications JT-70

Pump head in position I

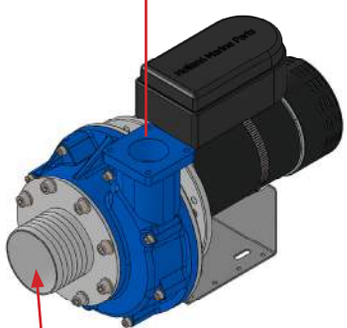


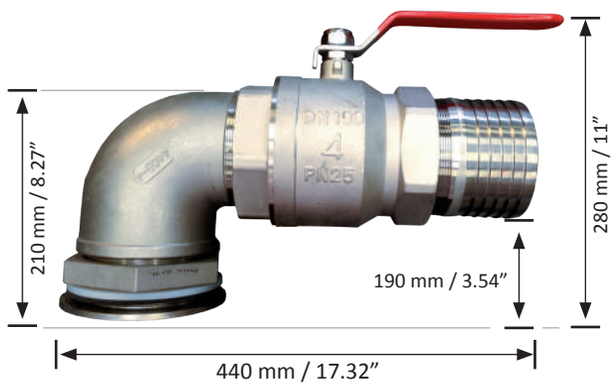
P-242-00: Straight pump outlet

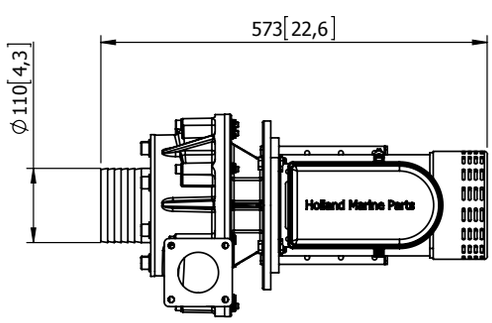
P-222-00: 90⁰ pump outlet

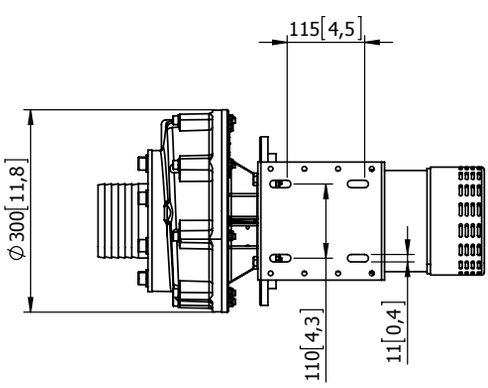
Water inlet assembly:
Connect with flexible hose to inlet on pump unit. Max. hose length 1 m / 3.3 ft

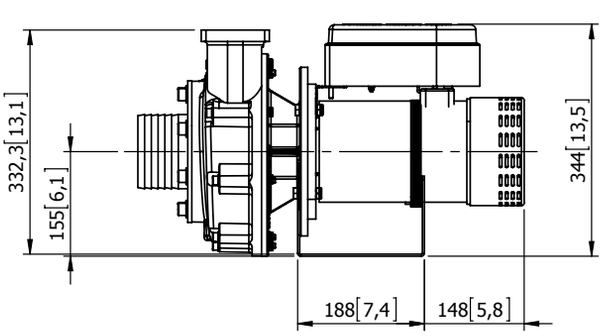
2 options for hose connector on pump outlet:

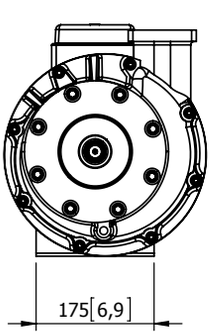




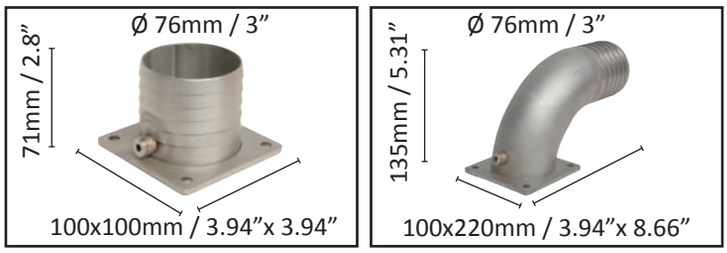








Technical Specifications JT-70
Pump head in position II

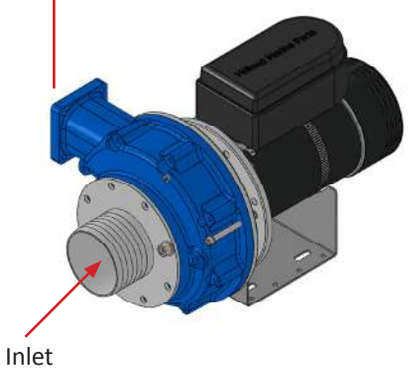


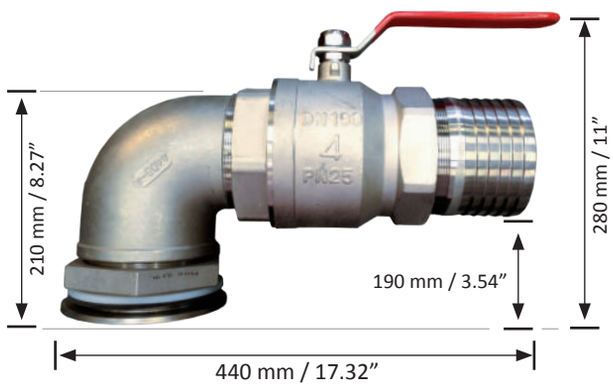
P-242-00: Straight pump outlet

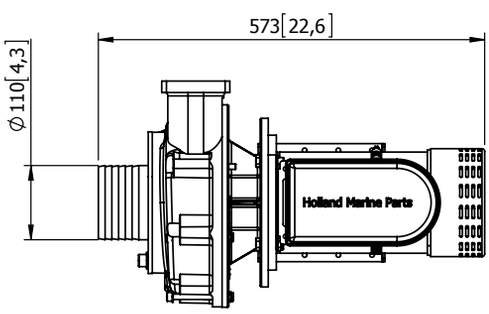
P-222-00: 90⁰ pump outlet

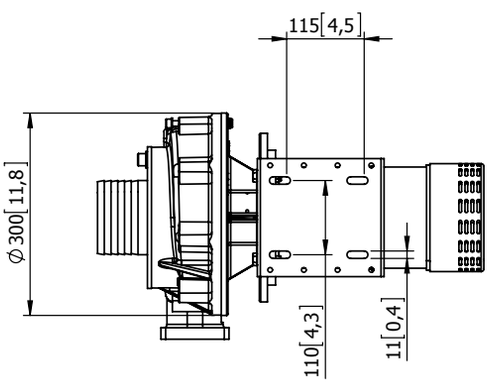
2 options for hose connector on pump outlet:

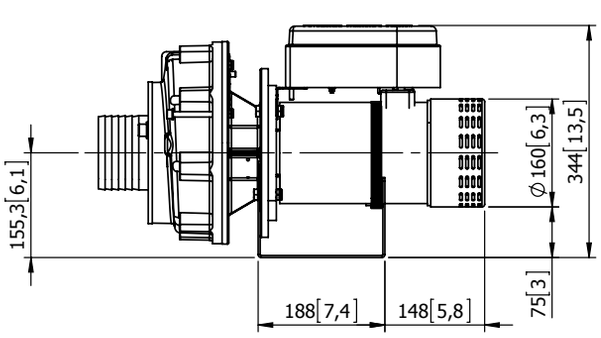
Water inlet assembly:
Connect with flexible hose to inlet on pump unit. Max. hose length 1 m / 3.3 ft

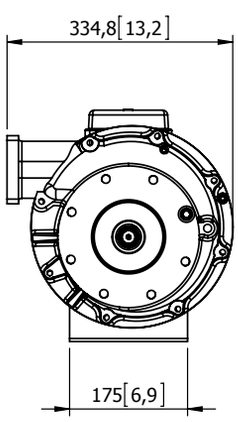




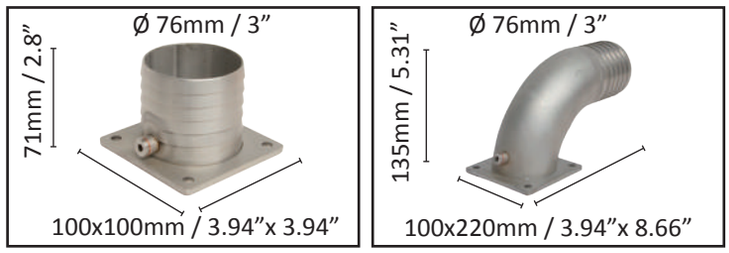








Technical Specifications JT-90
Pump head in position I

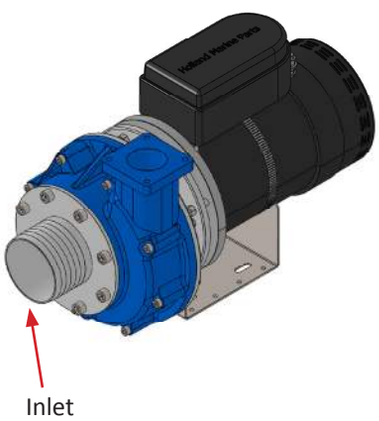


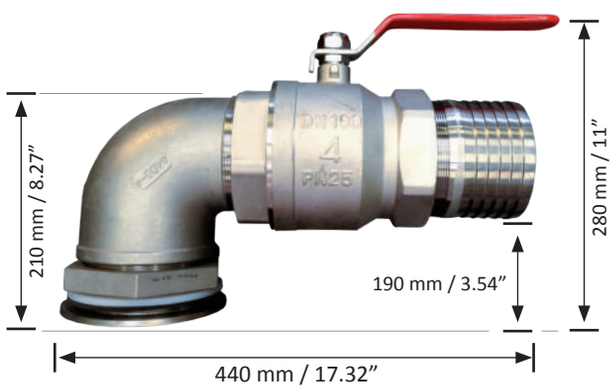
P-242-00: Straight pump outlet

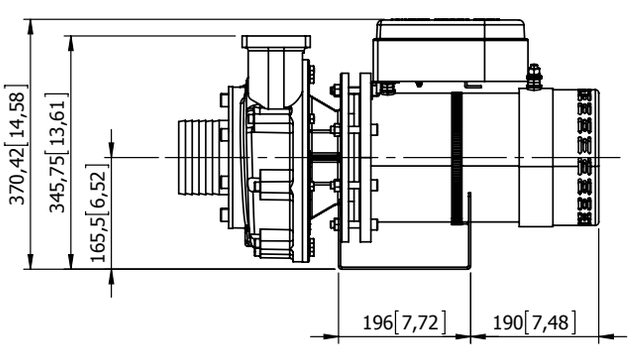
P-222-00: 90⁰ pump outlet

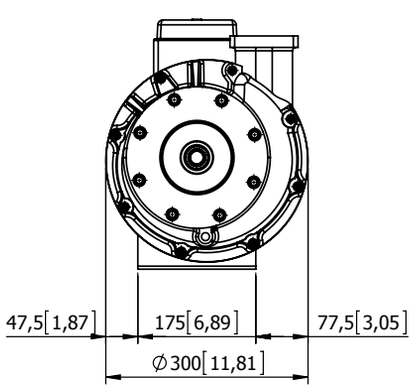
2 options for hose connector on pump outlet:

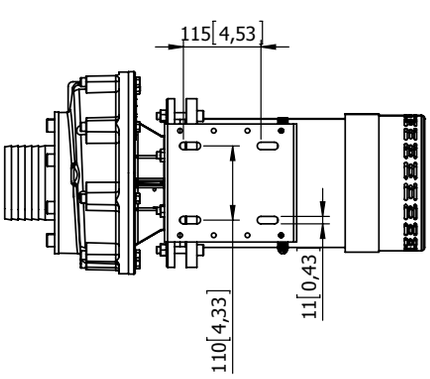
Water inlet assembly:
Connect with flexible hose to inlet on pump unit. Max. hose length 1 m / 3.3 ft

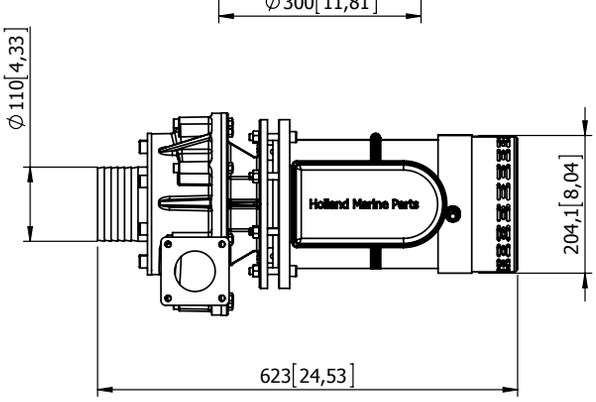




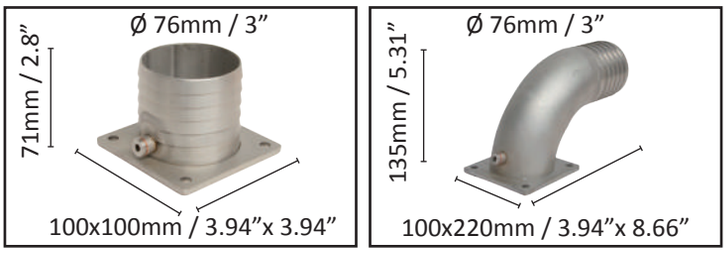








Technical Specifications JT-90
Pump head in position II

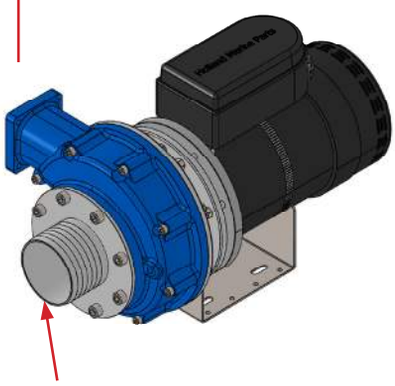


P-242-00: Straight pump outlet

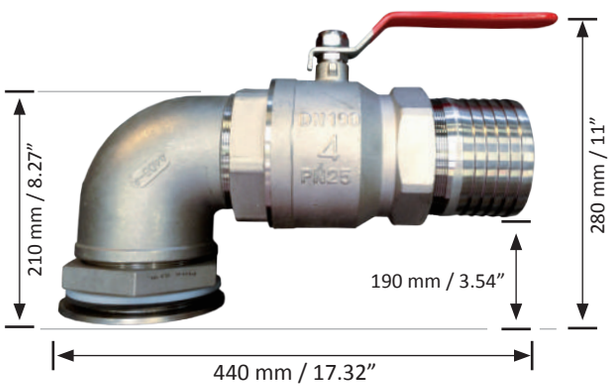
P-222-00: 90⁰ pump outlet

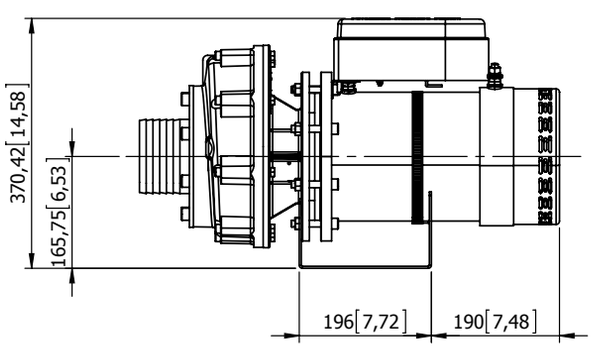
2 options for hose connector on pump outlet:

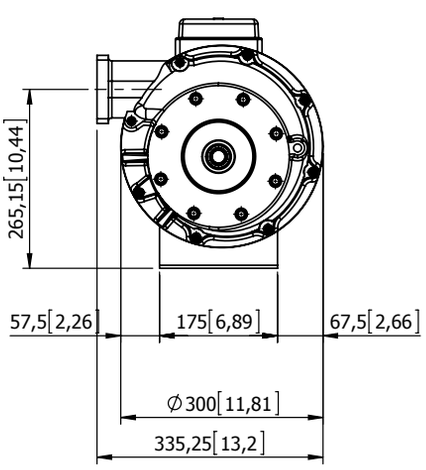
Water inlet assembly:
Connect with flexible hose to inlet on pump unit. Max. hose length 1 m / 3.3 ft

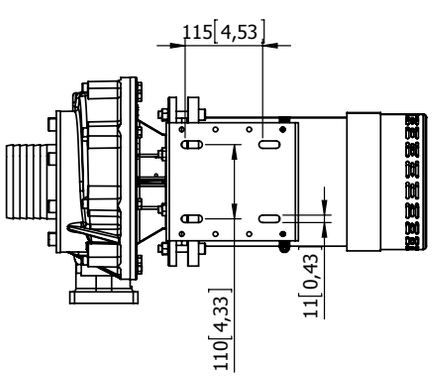


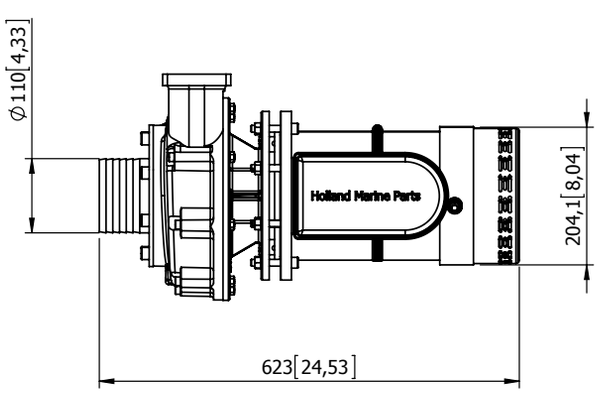
Inlet



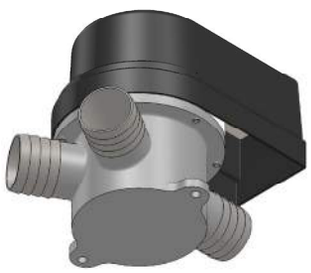


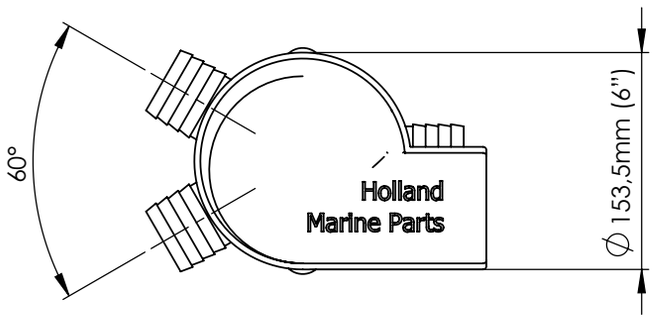


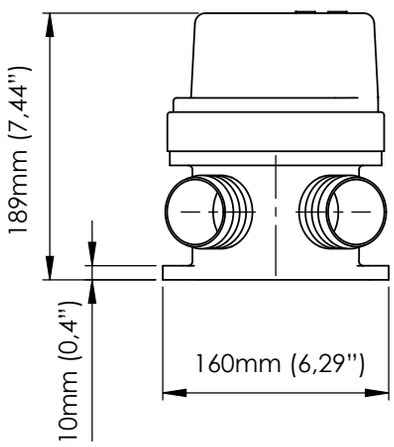


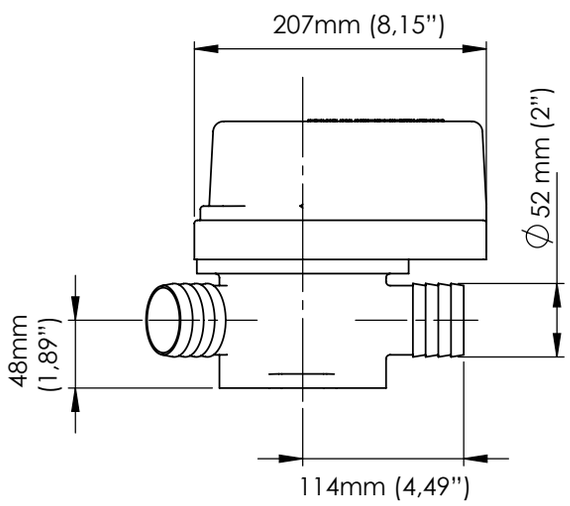


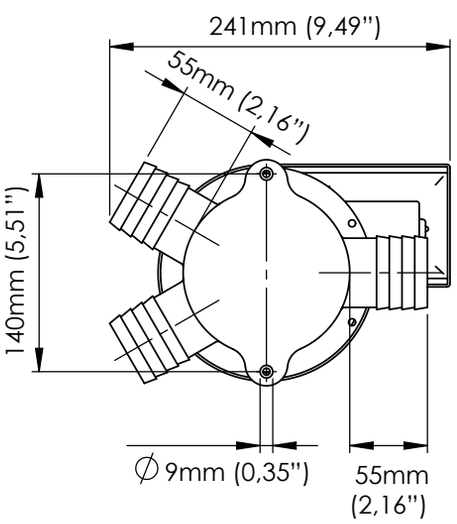
Technical Specifications 3-way valve JT-30 / JT-50

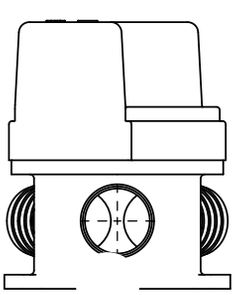




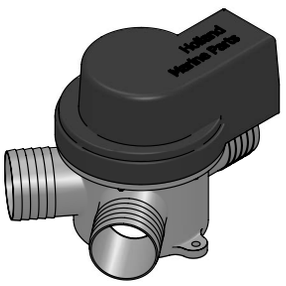


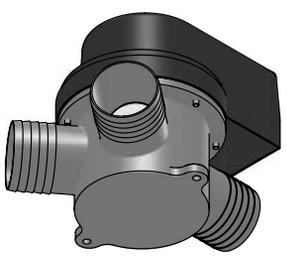


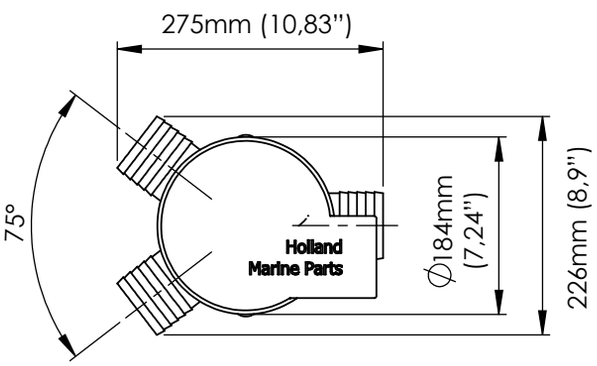


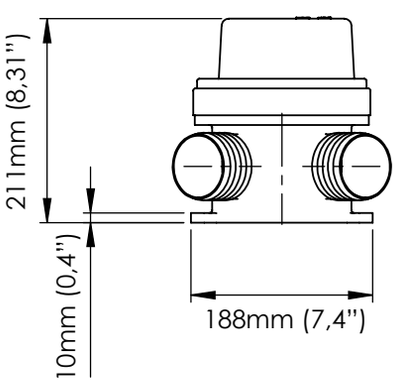


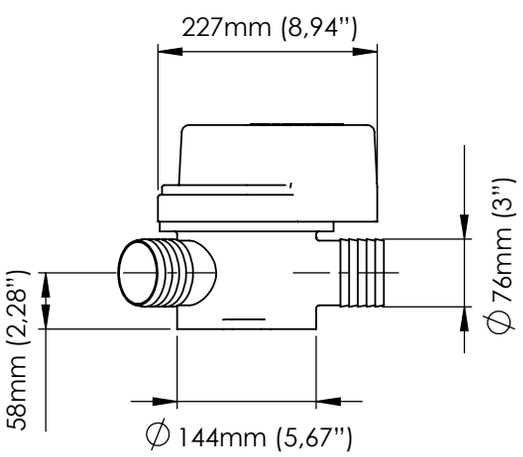
Technical Specifications 3-way valve JT-70 / JT-90

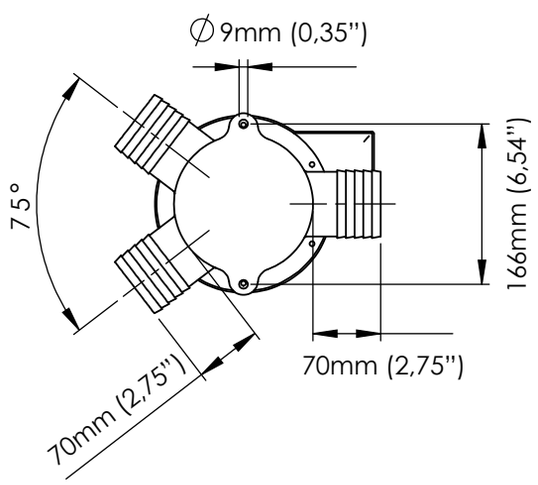


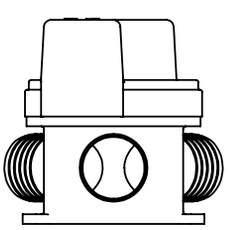












Installing the Jet Thruster components:

All orifices are located below the water line. Extra attention needs to be given to securing and installing the included hose clamps around the pressure hoses. The included hose clamps are robust and of high quality.

Holland Marine Parts recommends using the included hose clamps. The installation of different hose clamps than the ones included with the system is at your own risk.

Mechanical Installation:

Keep the following points in mind during the mechanical installation:

A: position of pump unit and water inlet combination (see page 38)

B: position of 3-way valve (see page 40)

C: position of nozzles (see page 42)

Note: *The Jet Thruster is most efficient when the connections between system components made with the included pressure hoses are as short as possible. Place the pump unit and the 3-way valve as close to the nozzles as possible to achieve this.*

Hose clamps:

Installation kit provides 1 hose clamp per bushing.

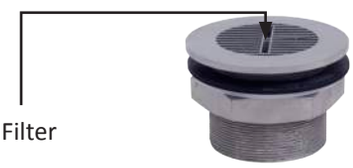
Pay attention when installing the provided Müllenbach two-shell hose clamps:

- Make sure all parts of the clamp slide into place when tightening the nuts.
- Make sure clamps are well placed and thoroughly fastened.
- To avoid corrosion, apply e.g. Protective spray to the clamp (Vaseline).
- After first operation of the system, check that clamps are tight.
- Inspect the clamps for their integrity annually.

A: Position of pump unit and water inlet combination

It is important to select a position for the pump unit at which it is located under the waterline.
The centrifugal pump does not self prime! If the pump is placed close to the waterline, or in case of fast moving vessels is can be necessary to install the optional Electrical air valve that will help to rapidly prime the pump. See page 76, 77. In addition to select the optimum position of the pump unit Holland Marine Parts advises to **place suitable battery's directly next to the pump unit in order to keep the battery cabling as short as possible!** The jet thruster uses a lot of electrical energy in a short period of time. **Short and correct battery cabling is mandatory in this situation!**

- **pump unit must be installed below water line.**
- Place the water inlet in the hull of the vessel.
- Exterior of hull: Flange of water inlet.
- Interior of hull: PP sliding ring, nut.



I-302-00
Water inlet SS 316

Please note: *Keep a maximum distance of 1 metre (3,3 ft) between the hose connector of the pump and hose connector on the ball valve assembly. 1 metre (3,3 ft) hose is provided for this purpose (I-312-00)*

Please note: *Exterior of hull: Apply a PU Marine Sealant (Polyurethane) on the flange of Water Inlet. See page 44, 45 for more information about installing the thru hull parts.*

Connections of stainless steel parts must be performed with a pu (Polyurethane) sealant.

water intake side

Standard configuration: 3" 90^0 degree elbow BSP SS 316, provided in installation kit.

water intake side

Option in case of steep hull or problems with alignment:

Available as option:
JT 30 / JT 50
1x Female / Female 3" BSP 45^0 elbow: I-354-00
1x Male / Female 3" BSP 45^0 elbow: I-364-00

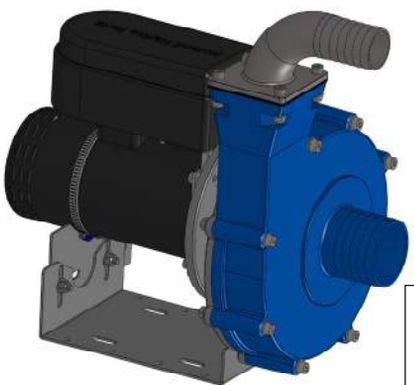
JT 70 / JT 90
2x male / female 4" BSP 45^0 elbow: I-272-00

Pump head position and pump outlets can be changed.
Contact your dealer or Holland Harine Parts for additional information.

Longitudinal placement:

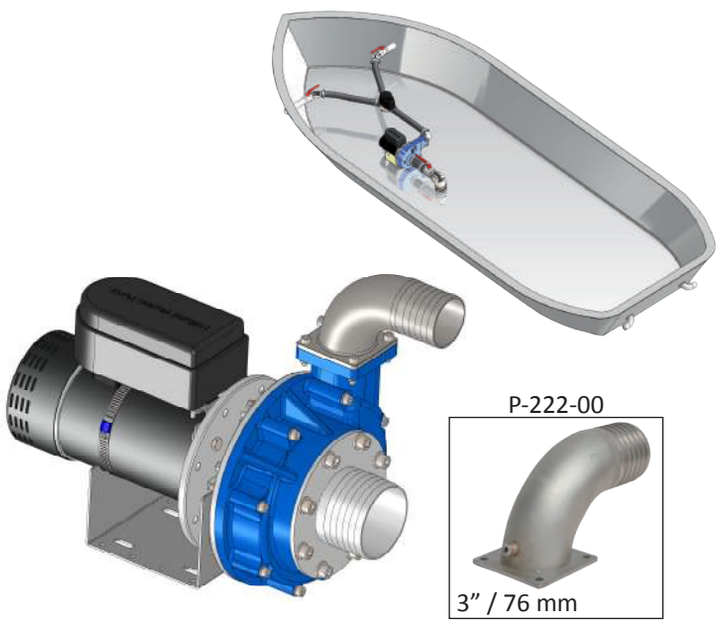
For longitudinal placement attach the 90° hose connector + rubber seal to the pump head.

Pump head position I



P-122-00

2” / 51 mm



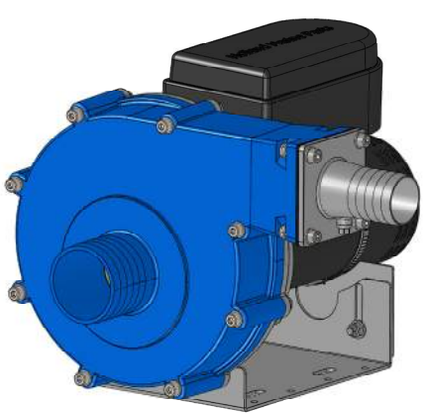
P-222-00

3” / 76 mm

Lateral placement:

For lateral placement attach a straight hose connector + rubber seal to the pump head.

Pump head position II



P-140-00

2” / 51 mm

P-242-00

3” / 76 mm

B: Position of 3-way valve

CAUTION: Prevent physical injury! When electrically turning the plunger present in the valve body, considerable force occurs. Prevent any body parts from getting trapped during installation.

Please note: By opening the lid of the valve, the watertight seal and bearing is broken.
Opening the valve will void your warranty.

- Place of the 3-way valve as close to the nozzles as possible.
- Mount the 3-way valve to the vessel. Use the recesses at the bottom of the valve body for this. (m8)
  Possition not necessary horizontal. It is possible to place the valve upside down or to the side (do not let it rest on the cover).
- Allways use the protective cover to protect the electrical parts.
- Can be placed above or below waterline in any position

- **See page 52-57 for the Jet Thruster Single electrical installation.**
- **See page 61-68 for the Jet Thruster Combi electrical installation.**

Jet Thruster Combi:
Dirt that builds up in the system, will be flushed out during use. The function of the 3-way valve allows for an amount of water flowing through, even when the valve is not in use. In a system that is in operation, water flowing out will be observed in all of the nozzles. This is normal and indicates that the system is functioning correctly.

V-200-00

C: Position of the nozzles

- Based on the type of hull you have chosen a certain nozzle type. Select this nozzle type and the corresponding installation instructions from the below scheme.

Please note: *Nozzles JT 30 and JT 50 are equipped with an internal Venturi. Do not damage or remove this constriction!*

Weldable	Part number	Diameter	Finishing
Steel	I-318-00	65 mm (2.59”)	cut off remaining length
SS316	I-320-00	60 mm (2.36”)	cut off remaining length
Aluminium	I-322-00	60 mm (2.36”)	cut off remaining length

Flange threaded (SS316)	Part number	Diameter	Finishing
0^0	I-324-00	60 mm (2.36”)	no finishing needed
25^0	I-330-00	60 mm (2.36”)	no finishing needed
35^0	I-333-00	60 mm (2.36”)	no finishing needed
45^0	I-336-00	60 mm (2.36”)	no finishing needed
55^0	I-339-00	60 mm (2.36”)	no finishing needed
Flange threaded 90^0 transom	I-342-00	60 mm (2.36”)	no finishing needed

nozzle 0^0

nozzle 25^0

nozzle 35^0

nozzle 45^0

nozzle 55^0

transom 90^0

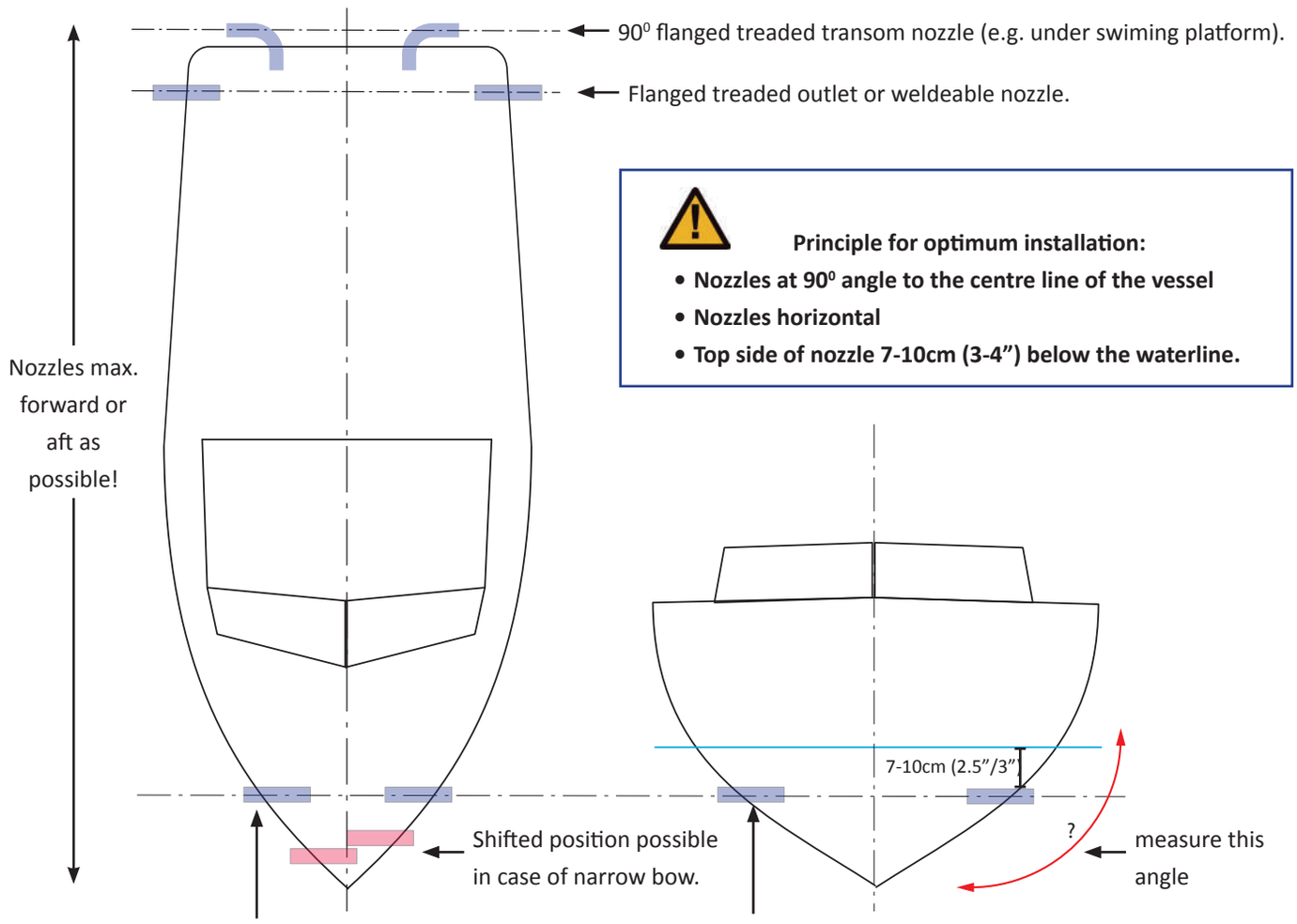
nozzle aluminium

nozzle SS316

nozzle steel

- The Jet Thruster will be most effective when the nozzles are placed AS FAR FORWARD OR AFT AS POSSIBLE.
  (shifted position possible as seen in diagram, to increase leverage arm).
- Top side of nozzle 7-10cm (2.5”/3”) below waterline.
- Keep in mind that when the nozzles rise above the waterline , it is possible by the powerful Jet of water expelled by the Jet Thruster inconvenience or damage may occur.
  Use the included 45 degree elbows in order to place the nozzles as far as forward or aft as possible.

In case of application as a stern Jet or in case of Jet Thruster Combi: place the system as far as possible to the stern.
If 90^0 Transom nozzles are installed in the stern, the system will be most efficient.

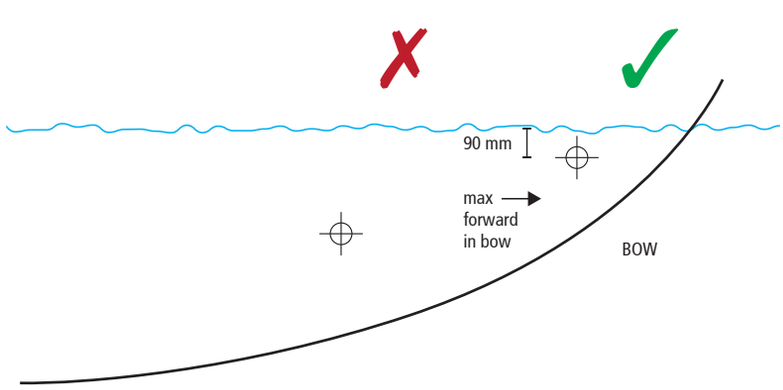

90⁰ flanged treaded transom nozzle (e.g. under swiming platform).
Flanged treaded outlet or weldeable nozzle.
Nozzles max. forward or aft as possible!
Shifted position possible in case of narrow bow.
7-10cm (2.5”/3”)
?
measure this angle

Principle for optimum installation:

- **Nozzles at 90^0 angle to the centre line of the vessel**
- **Nozzles horizontal**
- **Top side of nozzle 7-10cm (3-4”) below the waterline.**

In case of a blund bow, concider an increased nozzle angle.
Nozzle can be rotated to achieve optimum position.

Choose the correct nozzle angle 0^0, 25^0, 35^0, 45^0, 55^0



Nozzle positions and installation options

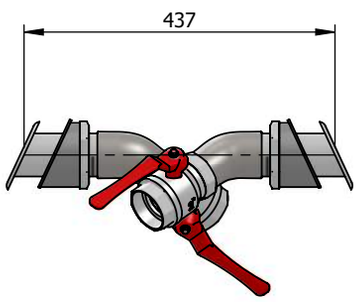
Note: The standard installation kit provides 1 x 2” 45^0 elbow.
Additional parts must be ordered separately.

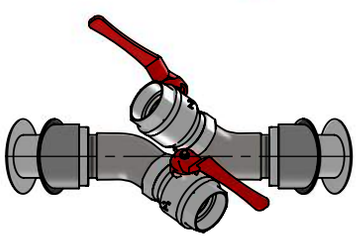
Note: If you do not need the 45^0 elbow in your installation: do not use it.

I-361-00
2” BSP, m/f, SS316

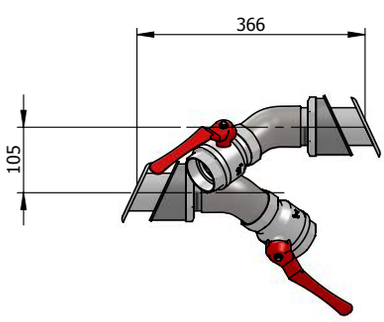
1 x 2” BSP 45^0 elbow to each nozzle.

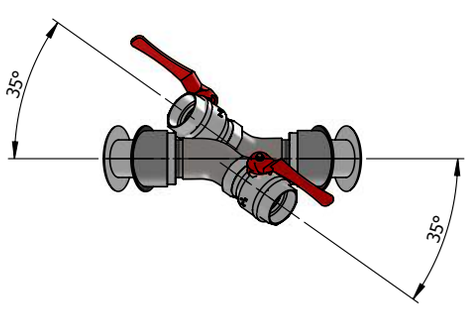
1. Crossed nozzle position



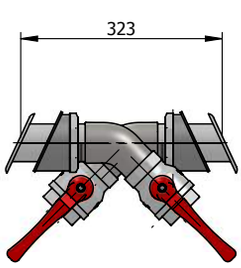


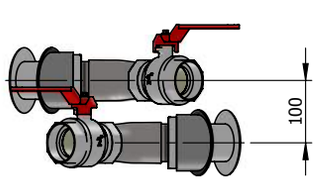
2. Horizontal shifted nozzle position





3. Vertical shifted and crossed nozzle position

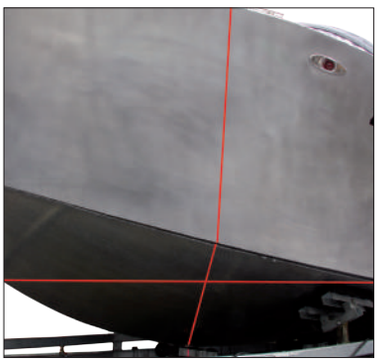




Installing the nozzles and water intake.

In case of steel or aluminum vessel plating weldable nozzles are available.
For polyester and wooden vessel plating flange treaded nozzles are available.

Learn more at:
www.youtube.com/user/hollandmarineparts



1: Place vessel horizontal. Select optimum position for nozzle: As far to the front of bow or stern as possible, top side of nozzle 10cm / 4" below water line. Nozzle horizontal and in 90˚ angle to the heart line of the vessel.

Note: *Not placing the nozzles as far to the front or aft as possible reduces the overall effectiveness of the system!*

Laser equipment can assist selecting optimum position and determine if vessel is placed perfectly horizontal.

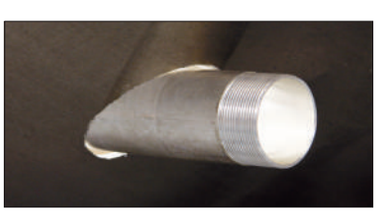
2: Make sure the position of both nozzles and the components like the ball valves, elbows, hose connector, hoses and hose clamp are not in conflict with available space before a hole is made.

Drill a pilot hole. Keep drill horizontal!

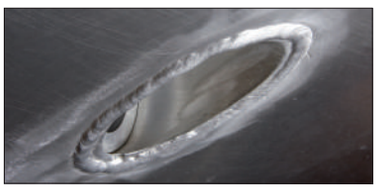
Nozzles can be positioned shifted horizontal and vertical in case of a narrow bow. Hoses can be crossed in order to place the nozzles further to the front of the bow. See image at point 8 for visible explanation.

3-4: Use a 60mm / 2⅜" hole saw to drill the holes for the nozzle.
Keep drill horizontal and in 90˚ position to the vessel's heart line.

5: Smoothen edges

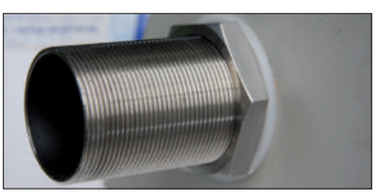


6: Fit in the nozzle and check if nozzle is placed horizontal and in 90˚ angle to the heart line of the vessel e.g. by inserting the nozzle from the inside out to determine if hole is drilled correct.



7: Outside of vessel:
Weldable nozzle: Weld in the nozzle and cut of remaining length. Smoothen surface.
Note: Do not cut into, or cut away the internal restriction within the nozzle!

Flange treaded nozzle: In case of an rough or not entire flat surface: Apply sealant for maritime purposes: Sikaflex-291i / 3M 5200 adhesive / sealant on the side of the flange of the nozzle that contacts the vessel plating.



In case of a smooth and flat surface: Apply the provided rubber seal.
Do not use additional sealant in combination with the rubber seal.
Inside vessel:
Place the PVC guide ring, white nylon ring and the 2" nut, apply sealant. Tightly fasten the nut.
Make sure the nozzle remains horizontal and in 90˚ heart line of the vessel.

8: Connect the ball valve, 45˚ elbow and the hose connector. All connections are BSP treaded. Apply PU Sealant for maritime purposes: e.g. Sikaflex-291i / 3M 5200 adhesive / sealant at every tread to connect and seal the parts.
Do NOT use teflon tape!

9: Thoroughly clean and degrease every tread that has to be connected. Make sure to use sufficient sealant on the tread. At least 6 threads and smoothen with e.g. finger over entire thread. Apply sealant on both parts that have to be installed. Remove spilled sealant immediately. Use acetone to remove Sikaflex-291i stains.

10: Installing the water intake: The position of the pump unit that has to be installed under the water line determines the location of the water intake. Make sure the position of the water intake and the components like the ball valve, elbow, hose connector, hoses and hose clamp are not in conflict with available space before a hole is made.
Drill a 90mm (3½" - JT30 & JT50, 4½" - JT70 & JT90) hole, smoothen edges.

11: Repeat installation process like suggested at point 7.

12: Thoroughly secure the flange treaded water intake by fasten the provided 3" nut.

Conservation of stainless steel components:

Preparation prior to anti fouling

Stainless steel has a natural ability to form a protective film which protects it from corrosion. In basis this is the reason why the stainless steel is corrosion resistant, but there are things to take into account: In case of a lack of oxygen, this film cannot be formed and corrosion (pitting/crevice corrosion possible will occur) Especially in warm salt water areas it's important to understand how to keep the parts free from corrosion:

There are 2 way to avoid corrosion to stainless steel parts:

Option 1:

- Do not paint stainless steel surfaces solely with antifouling or other paint systems.
  If you paint the hull with anti fouling, do not paint the stainless steel parts

- **Keep stainless steel surfaces free from barnacles, or all other fouling.**
  Remove fouling as soon as possible. Keep surfaces clean. Do not scratch the surfaces with metal tools.

- **Run the Jet Thruster system:**
  By using it you clean it and fresh oxygen-rich water ensure formation of the protective film

Option 2:

If painting of stainless steel surfaces is required: When you want to paint stainless steel parts with anti fouling

Important!
The parts must be coated with a water and vapor proof epoxy primer.

All stainless steel parts must be thoroughly cleaned and sanded (sand blasted)

Use quality Epoxy primer suitable for stainless steel surfaces: At least 5 layers, and finally a antifouling must be processed to ensure a vapor proof coating of the stainless steel surface. Nozzles and water inlet must be coated on the in- and outside.

Note: *There are many different Epoxy primer and paint systems available.*
Ask the professional supplier of these products for the right products, surface preparation, film thickness and methods of application to ensure a water and vapor proof coating of the submerged stainless steel parts. If this coating is not vapor proof, most likely corrosion will occur.

Read inspection and maintenance chapter at page 80.

Electrical Installation

Electrical Installation: Jet Thruster Single

Holland Marine Parts recomments Optima Batteries

OPTIMA™
BATTERIES
THE ULTIMATE POWER SOURCE™

Optima battery YT S 5.5L

JT-30 12V	1 x YT S 5.5L 75Ah
JT-50 24V	2 x YT S 5.5L 75Ah
JT-70 24V	4 x YT S 5.5L 75Ah
JT-90 24V	4 x YT S 5.5L 75Ah

Visit our website
www.jetthruster.com
for additional information.

! If you decide not to use Optima Batteries: Apply batteries with at least 1000A CCA (Cold Crancking Amps.)

Jet Thruster pump units

JT-30 - 30KGF - 66 thrust LBS - 12V

Force	30 Kgf
Voltage DC	12V
E-motor capacity kW	3kW
Current	480A
Master fuse	500A
Recommended battery capacity 12V	1 x Optima Yellow Top 55Ah
Battery cable +/-	1m -> 50mm² / 3ft -> 1/0 AWG
Water inlet	1 x Ø 90 mm/3½"
Water outlet	Nozzle Ø 36mm/1,26"
Pressure hose diameter	2" / 51 mm
Weight pump	29kg/64LB

JT-50 - 50 KGF - 110 thrust LBS - 24V

Force	50 Kgf
Voltage DC	24V
E-motor capacity kW	6kW
Current	480A
Master fuse	500A
Recommended battery capacity 12V	2 x Optima Yellow Top 75Ah
Battery cable +/-	1m -> 50mm² / 3ft -> 1/0 AWG
Water inlet	1 x Ø 90 mm/3½"
Water outlet	Nozzle Ø 36mm/1,26"
Pressure hose diameter	2" / 51 mm
Weight pump	34 kg/75 LB

JT-70 - 70 KGF - 154 thrust LBS - 24V

Force	70 Kgf
Voltage DC	24V
E-motor capacity kW	11kW
Current	800A
Master fuse	850A (2x 425A)
Recommended battery capacity 12V	4 x Optima Yellow Top 75Ah
Battery cable +/-	1m -> 70mm² / 3ft -> 3/0 AWG
Water inlet	1 x Ø 4"
Water outlet	Nozzle Ø 50mm
Pressure hose diameter	3" / 76 mm
Weight pump	49 kg/95 LB

JT-90 - 90 KGF - 198 thrust LBS - 24V

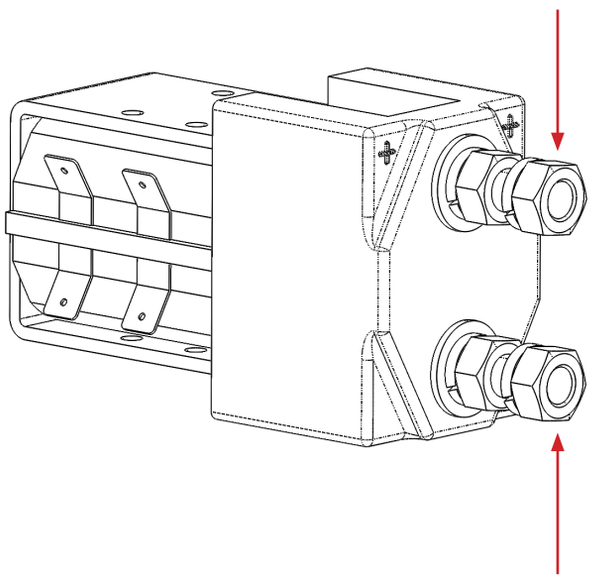
Force	90 Kgf
Voltage DC	24V
E-motor capacity kW	15,5kW
Current	1000A
Master fuse	1000A (2x 500A)
Recommended battery capacity 12V	4 x Optima Yellow Top 75Ah
Battery cable +/-	1m -> 95mm² / 3ft -> 4/0 AWG
Water inlet	1 x Ø 4"
Water outlet	Nozzle Ø 50mm
Pressure hose diameter	3" / 76 mm
Weight pump	61 kg/130 LB

Torque on battery cable connections

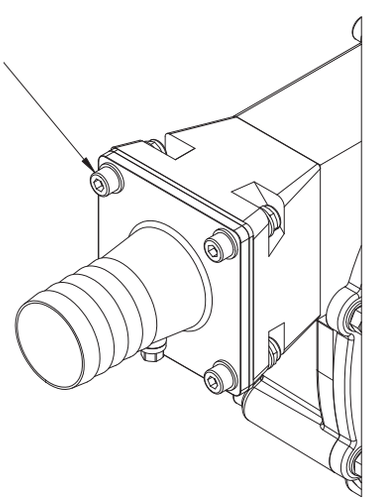
Warning: Loose or unsufficient tightened battery connections can cause damage or fire.
Make sure to tighten the nuts of the connections as mentioned.
Use quality terminals and right crimping tools to ensure a quality electrical installation safety!

Battery cable terminals contactor SW-200

M10 main terminals to be tightened within the range 13.4 to 14.6 Nm

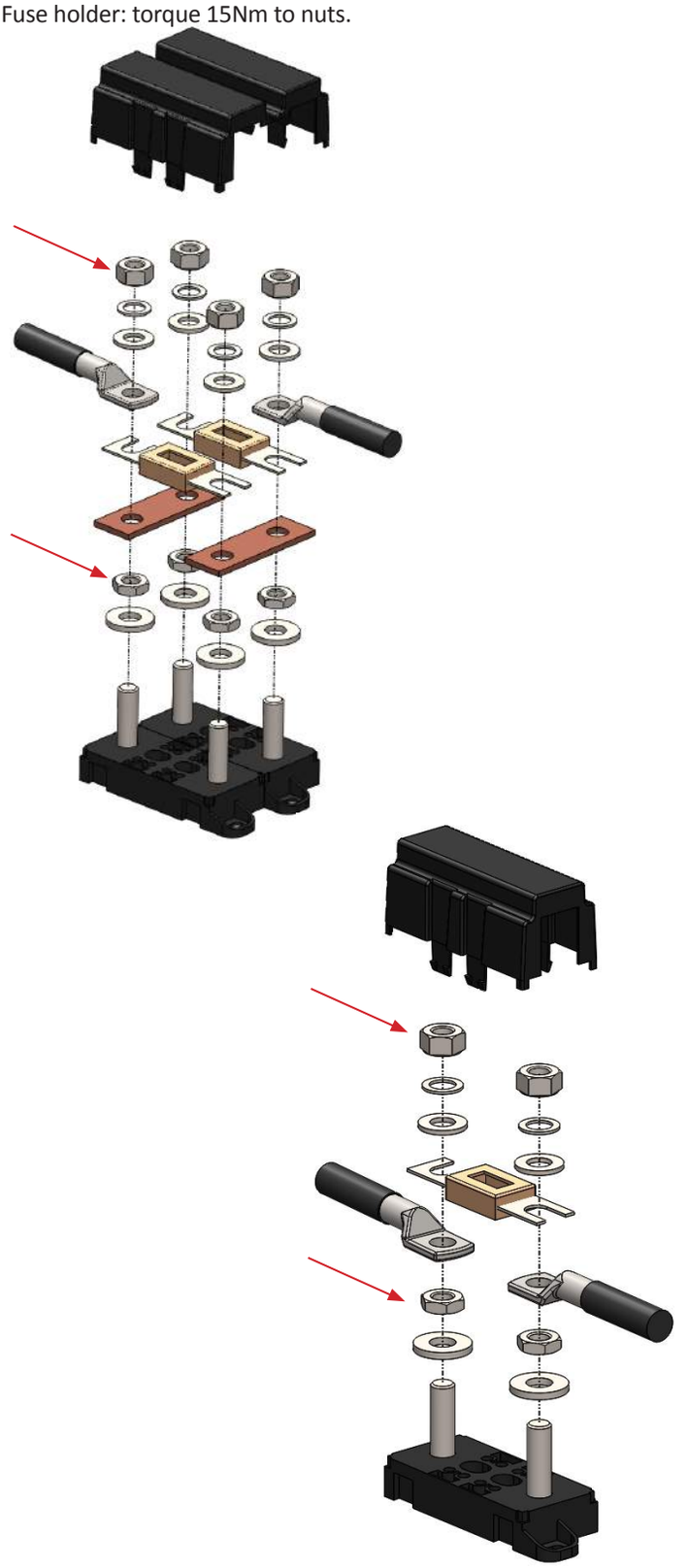


Torque max. 9Nm



Note: Overtightening will press out the seal and damage the pump head!

Fuse holder: torque 15Nm to nuts.



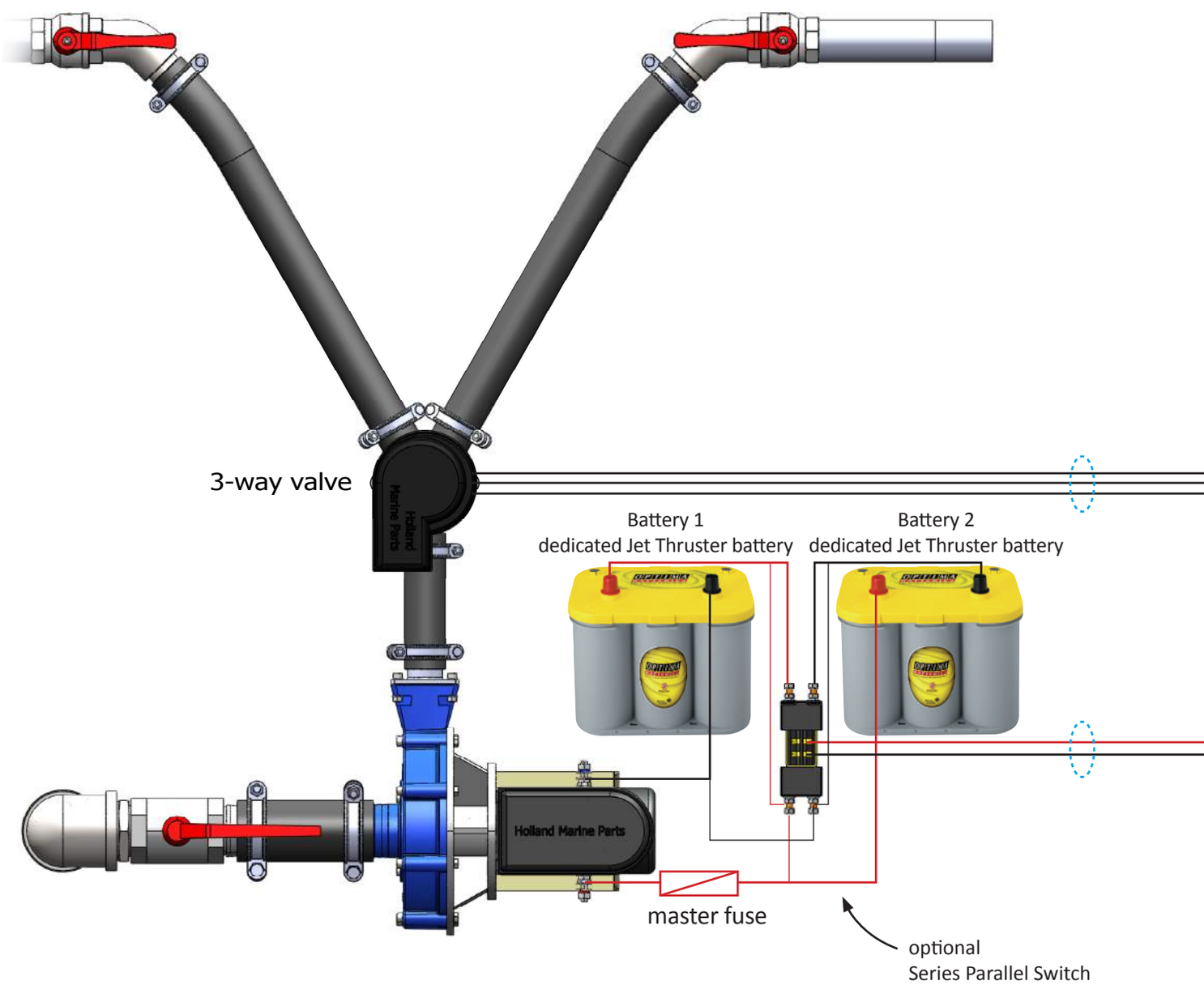
Electrical Installation Jet thruster Single

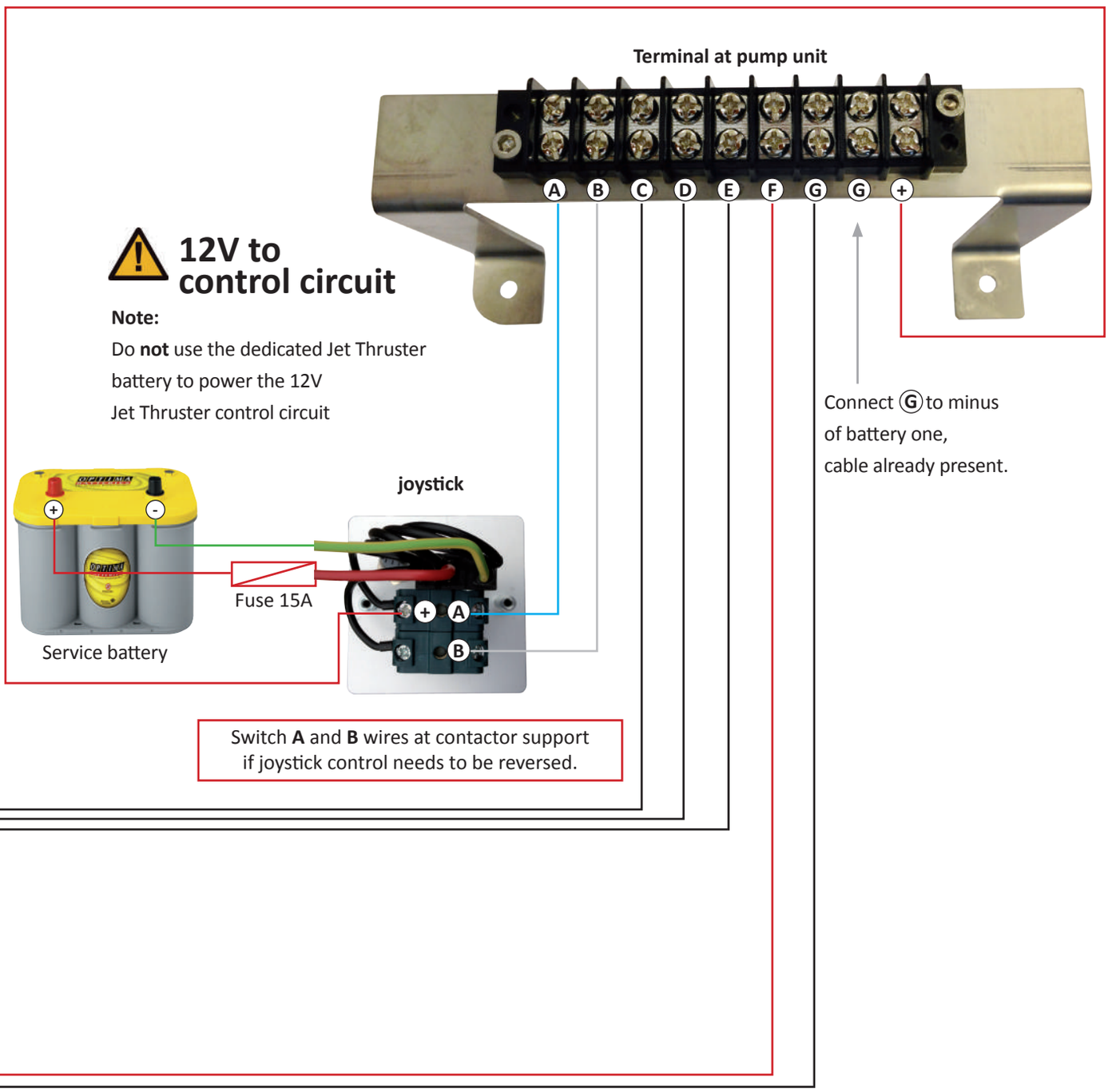
Is your boat is equipped with a 12V circuit but you need 24v to run the Jet Thruster?
Not a problem with use of our Series parallel Switch!
This system uses two dedicated 12V batteries to create a temporary 24V circuit that powers the 24V Jet Thruster.

Battery cable length max 1m/3.3ft in total:

Positive: max 50cm/20”
Negative: max 50cm/20”

- **Battery Positive to free contact at contactor relay**
- **Connect A connection from pump unit to battery negative**

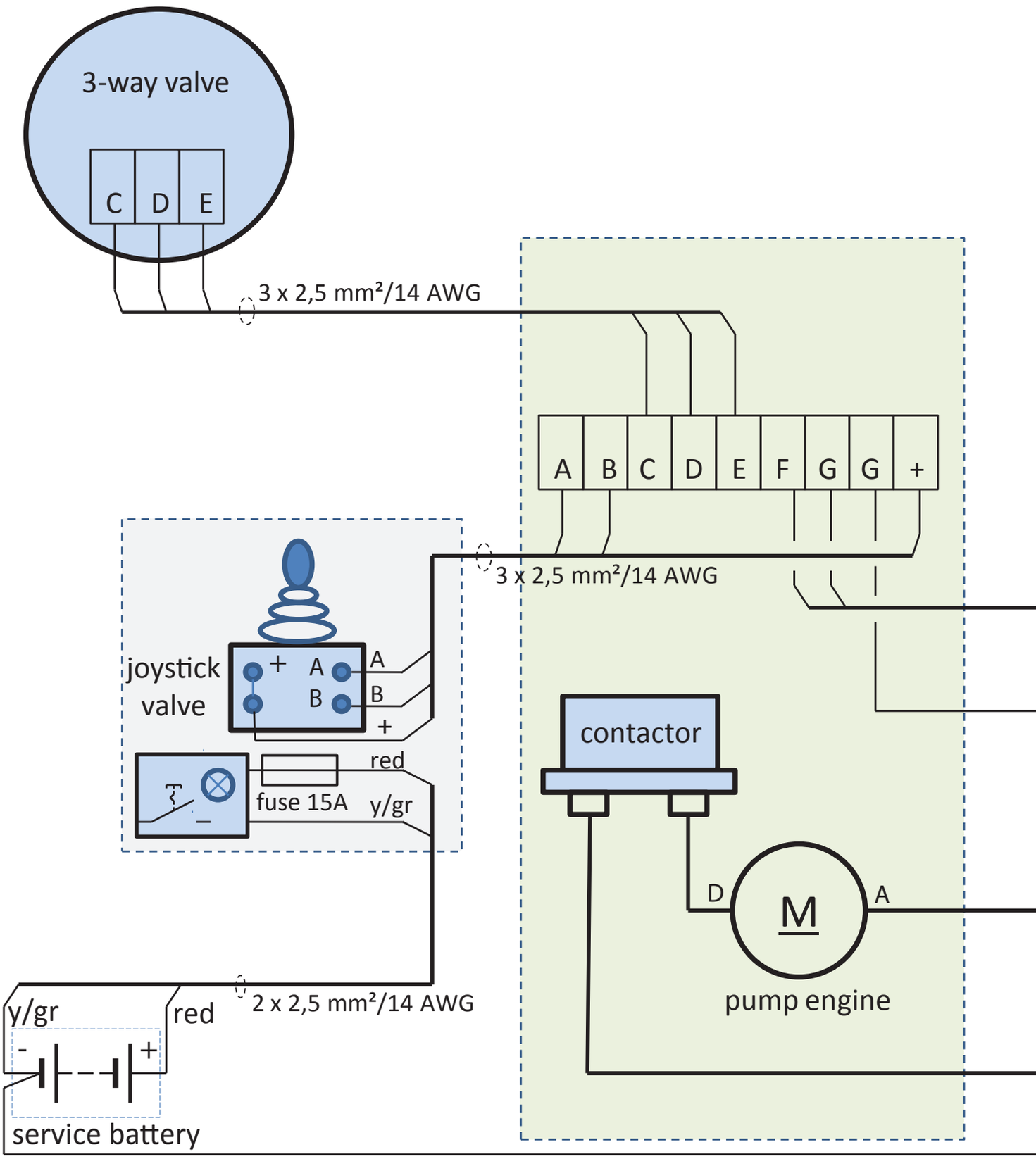


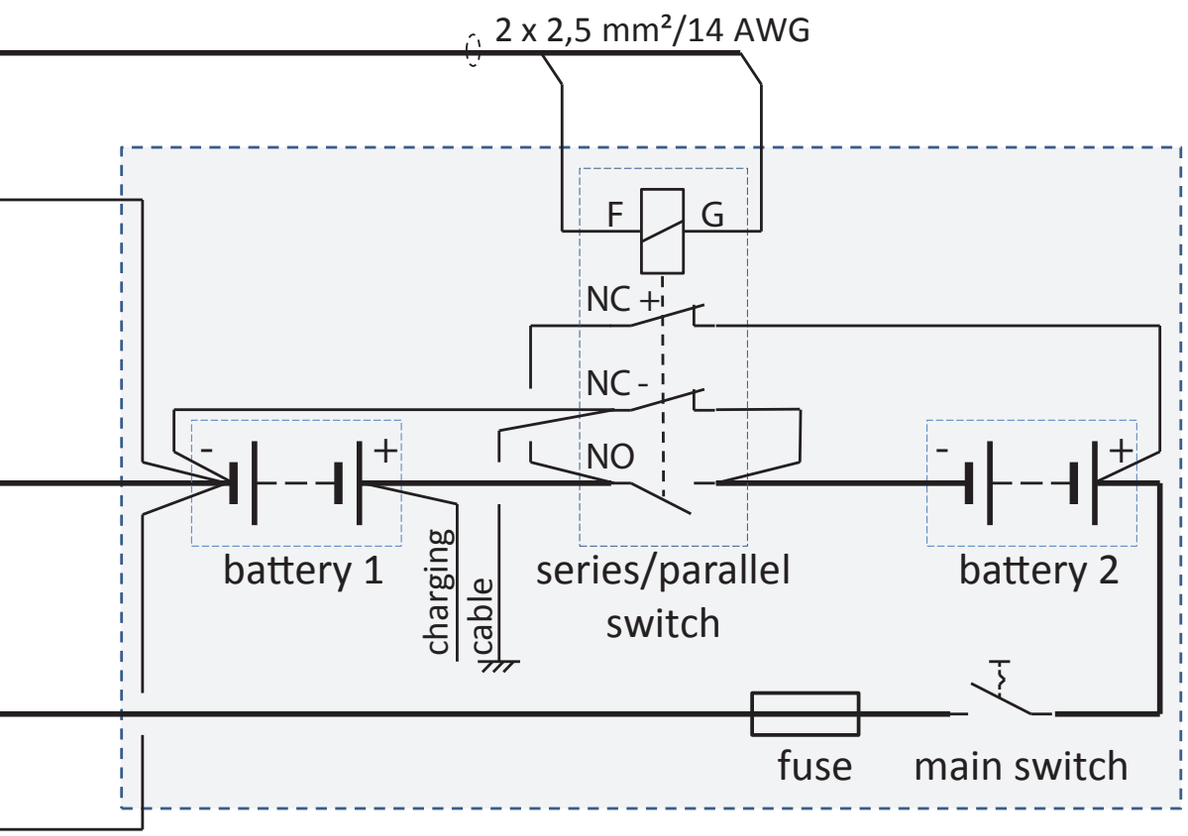


+ Serie Parallel Switch / Electrical Air valve to: **F**

- Serie Parallel Switch / Electrical Air valve to: **G**

Electrical diagram Jet Thruster Single




2 x 2,5 mm²/14 AWG
F
G
NC +
NC -
NO
-
+
-
+
battery 1
charging cable
series/parallel switch
battery 2
fuse
main switch

The electrical installation of the Jet Thruster is very simple. In the **appendices** you will find the schematic diagrams of the wiring to be applied.

The electric motor of the Jet Thruster generates a lot of power in a short period of time. It is necessary to connect dedicated batteries to the system. It is necessary to make the connection between this battery and the system as short as possible. Use appropriate battery cables and connecting material for this at all times.
The system must be equipped with the included main fuse, which must be installed in the battery positive cable.
You can use the power supply for the joystick from an existing dashboard or ignition switch. This needs to be secured with the included 15A fuse.
For safety reasons, the Jet Thruster should be provided with a suitable main switch (not included).

The joystick operates on 12V. For vessels with a 24V installation, a DC-DC converter must be applied.

Please note: Place batteries directly next to the pump unit.
Keep battery cables as short as possible to avoid voltage drop and loss of energy.

Please note: *For a 12 Volts ship's circuit you need to install a series-parallel switch to be able to charge the system on 12V and use it on 24V. The JT-50, JT-70 and JT-90 come with a connection wire **F and G** as a standard accessory for this switch. For 24V Series parallel see page 72.*

Recommended battery cabling: (at a total length of max. 1m/3ft)!

JT-30 (12V) 50 mm² (1/0 AWG) for 1m/3ft
JT-50 (24V) 50 mm² (1/0 AWG) for 1m/3ft
JT-70 (24V) 70 mm² (2/0 AWG) for 1m/3ft
JT-90 (24V) 95 mm² (3/0 AWG) for 1m/3ft

Positive cable total length max. 50cm./1.64 ft
Negative cable total length max. 50cm./1.64 ft

To avoid long cable length:
Batteries must be placed directly next to pump unit!

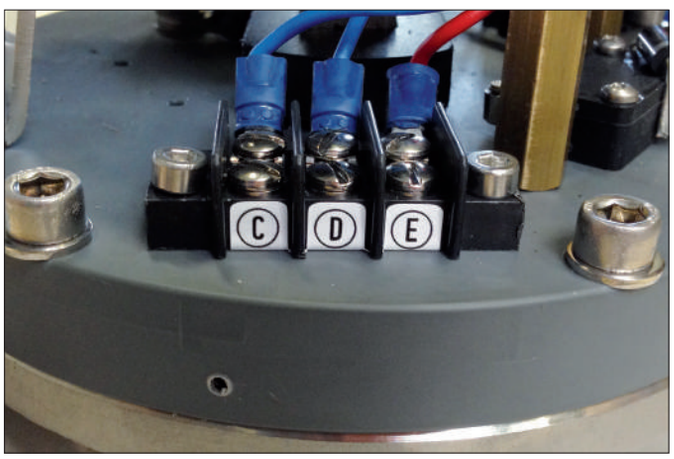
For optimum performance keep battery cables as short as possible!!

Charging the batteries:
In order to keep the ship's circuit separate from the Jet Thruster battery/batteries it is recommended to divide the charging current with a diode bridge or MosFet battery separator from the alternator.

Please note: More electricity will be required as a result of the installation of the Jet Thruster. That is why in some cases it is recommended for the alternator to be converted to high yield or to place a separate alternator.

Step 4: Install the joystick in the recess with the included bracket and assembly nuts. Screw installation nuts on hand tight.

Step 5: **JT Single:** Pull one cable (3x2.5mm^2, 14 AWG) from the pump unit to the 3-way valve and connect it to the screw connectors marked **C, D and E.**



3-way valve Jet Thruster Single

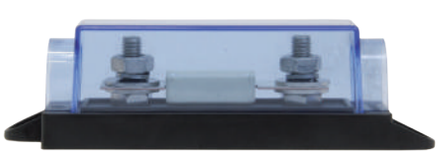
Step 6: **JT-50 24V, JT-70 and JT-90**: Use the connectors **F and G** on the pump to connect the series-parallel switch (page 71).

Step 7: Connect the insulated battery cables of the right type and place the main fuse and a suitable main switch.

Holland marine Parts main switch: E-102-00

ANL fuse holder & fuses

I-254-00

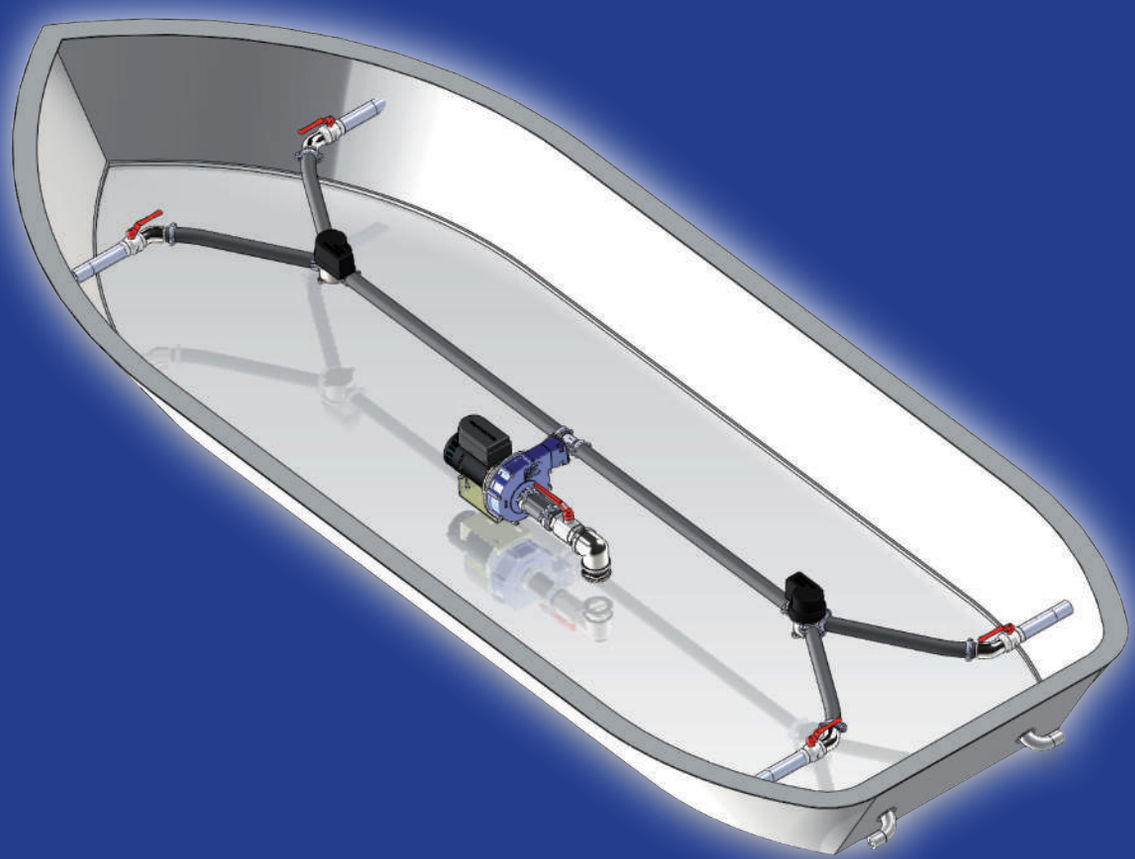


JT-30 12V / JT-50 24V => 1 x 500A

I-255-00

JT-70 24V => 2 x 425A
JT-90 24V => 2 x 500A

Installing the Jet Thruster Combi



Installing the Jet Thruster Combi

The Jet Thruster Combi works with one centrally placed pump unit and two 3-way valves for steering the bow and stern of your vessel.

What is distinctive about the Combi is that the water pressure from the pump unit is divided in the direction of the bow and stern. The manifold that is placed on the pump unit ensures this division.

In contrast to the 3-way valves of the Single edition of the Jet Thruster, the 3-way valves of the Dual are turned to a closed position whenever the system is not active. When the system is activated, water flows under pressure to the selected and opened 3-way valve. The advantage of the Jet Thruster Dual is that both 3-way valves can be operated simultaneously and in different positions.

This offers you the capability of operating the bow and stern independently of each other with one system.

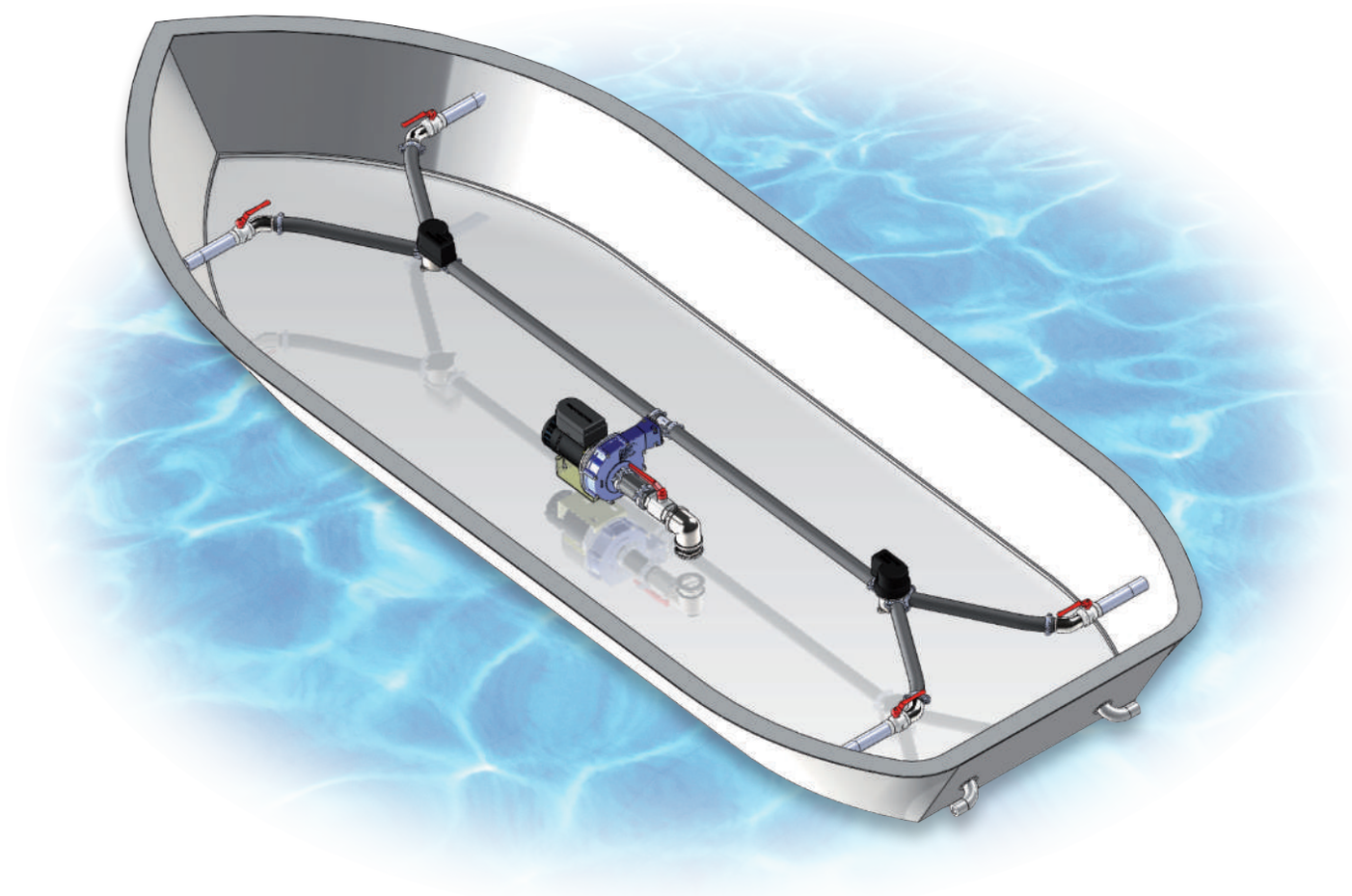
See appendices at page 18 & 19 - 22 & 23 for a schematic view of installation.

Keep the following points in mind during the mechanical installation:

A: Position of pump unit and water inlet combination (see page 38)

B: Position of 3-way valves (see page 40)

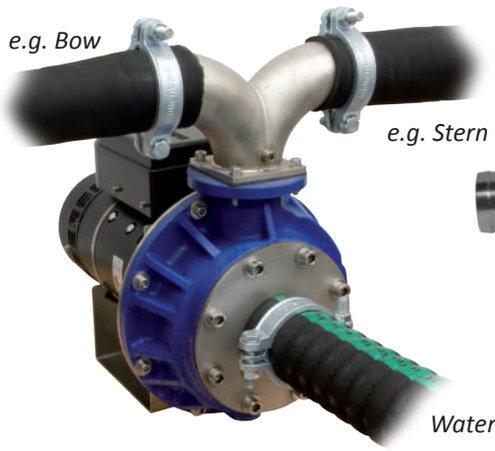
C: Position of nozzles (see page 42)



A: Position of pump unit and water inlet combination

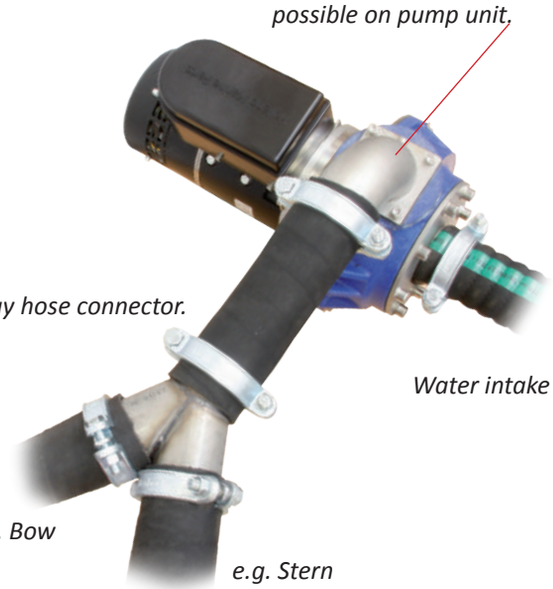
Choose a central position for the pump unit; for example, in the midship, where you need to take the water inlet combination into account.

Very important: Pump head must be installed under the waterline!
From the pump outlet you connect a pressure hose to the 3-way valve in the stern. To make the most efficient use of the system, it is best to use the shortest possible hose lengths. If you need to make bends, these should be as fluid as possible. Prevent sharp bends. Every bend increases resistance and reduces efficiency.



2-way 90⁰ Hose connector mounted on pump unit.
Two positions possible.

Four directional positions possible on pump unit.



Pump outlet 90⁰ degrees in combination with 3-way hose connector.
Four directional positions possible on pump unit.

The flexible hoses should be attached adequately to prevent vibrations and chafing. You should prevent the hose coming into contact with sharp parts or other elements present that could damage or pierce the hose.

The Jet Thruster should preferably be provided with its own battery. To make the most efficient use of the system, you should place the battery as close to the pump unit as possible and keep the battery cables as short as possible.

During simultaneous operation of the bow and stern, the thrust generated by the pump unit is divided over the bow and stern. Partly due to this, you can manoeuvre the ship laterally or around the ship's pivot point. However, the thrust per opened outlet is reduced during the simultaneous operation of the two 3-way valves present. Familiarise yourself with the reaction speed of the system.

Electrical installation Jet Thruster Combi

See appendices at page 64 - 65 for a schematic representation of the electrical connections.

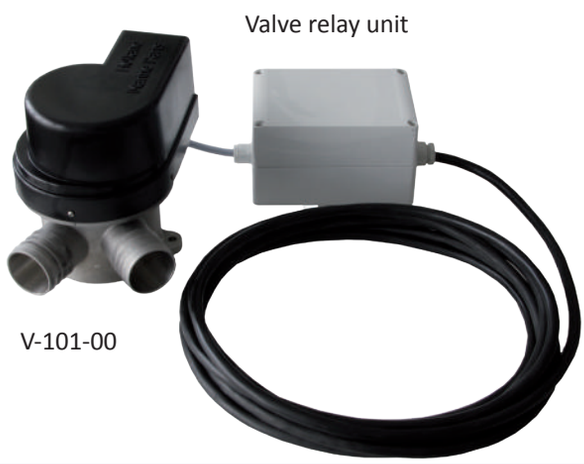
The electrical connection of the Jet Thruster Dual includes two different phases.

A: 12V or 24V power supply for the electric motor of the pump unit, depending on specific Jet Thruster system.
In the case of a 12 Volt vessel's circuit, the 24 Volt Jet Thruster systems JT-50, JT-70, and JT 90 should be provided with 2 batteries and a series parallel switch (see p. 71).
See pages 71 - 75 for the correct connection method of this switch.

B: Connection and power supply of the control and operation of the Combi system.
Take note, the power supply for the relay unit is 12V!

Do not use a battery that powers the motor of the pump unit to power the control circuit of the Jet Thruster!
The battery that powers the Jet Thruster should be used for this purpose only!

The 3-way valves for the Jet Thruster Combi are standard equipped with a relays unit and 10m (31 ft) neoprene cable. (5 x 1,5mm^2, 16 AWG)



Do not disconnect, remove or change the standard provided cables from the 3-way valve and the relays unit. This will void the warranty.

Step 1: Select position for valve and relays unit. Protect the electrical components from water. It is preferred to place the 3-way valve relay unit to be accessible for inspection.

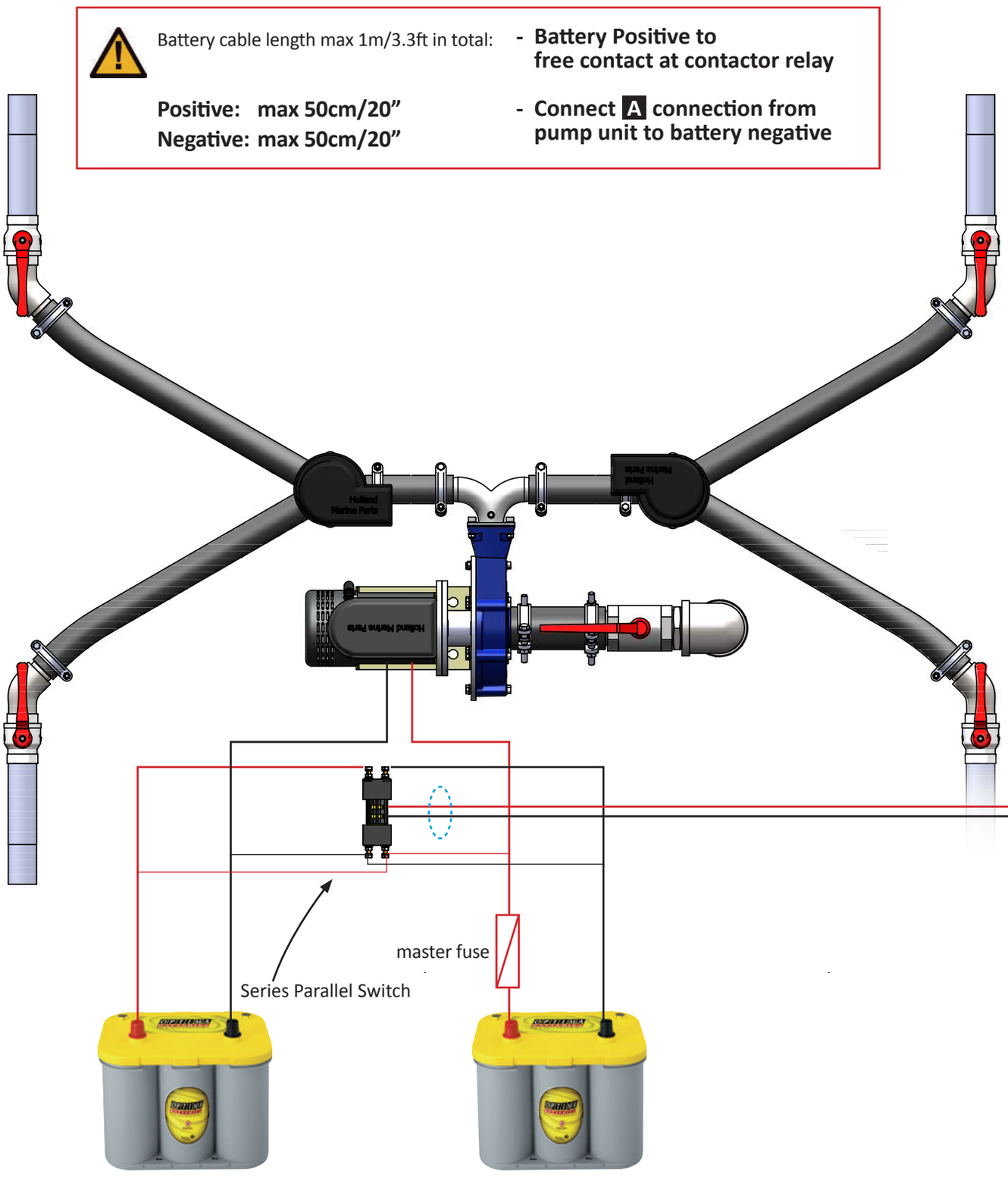
Step 2: Pull the provided neoprene cable (5 x 1,5mm^2) from the position where the valve is located to the actuator support on top of the pump unit. If necessary the cable can be extended with similar cable. (Cable type H07RNF)
Please note: do not combine different colors in the pairs. This can damage the system!

Step 3: Pull a cable (5 x 2,5mm^2, 14 AWG) from the joystick to the actuator support on to connect the joy stick with the AB AB screw connectors on the joystick and on the Actuator support.

Step 4: Attach 1 circuit of this at step 3 mentioned 5 x 2,5 mm^2, 14 AWG cable (1 x 2,5mm^2, 14 AWG) from the primary side of Joystick to the **+** screw connector on the actuator support.

Electrical Installation Jet Thruster Combi

Is your boat is equipped with a 12V circuit but you need 24v to run the Jet Thruster?
Not a problem with use of our Series parallel Switch!
This system uses two dedicated 12V batteries to create a temporary 24V circuit that powers the 24V Jet Thruster.


Battery cable length max 1m/3.3ft in total:
Positive: max 50cm/20”
Negative: max 50cm/20”
- Battery Positive to free contact at contactor relay
- Connect A connection from pump unit to battery negative
master fuse
Series Parallel Switch

Battery 1
dedicated Jet Thruster battery

Battery 2
dedicated Jet Thruster battery

Connect Ⓖ to minus
of battery one,
cable already present.

12V to control circuit

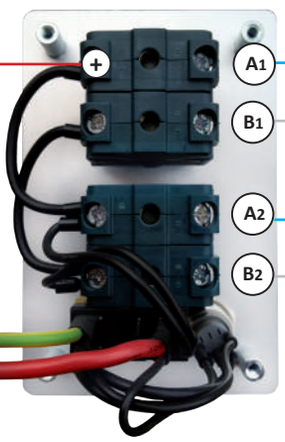
Note:

Do **not** use the dedicated Jet Thruster battery to power the 12V Jet Thruster control circuit.

Terminal at pump unit

(+)
12V

5 x 2,5 mm², 14 AWG



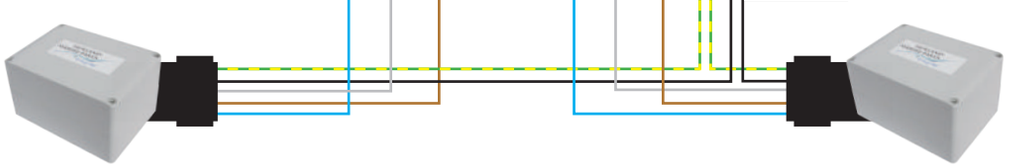
Service battery

fuse

Switch **A** and **B** wires at contactor support if joystick control needs to be reversed.

+ Serie Parallel Switch / Electrical Air valve to: **F**

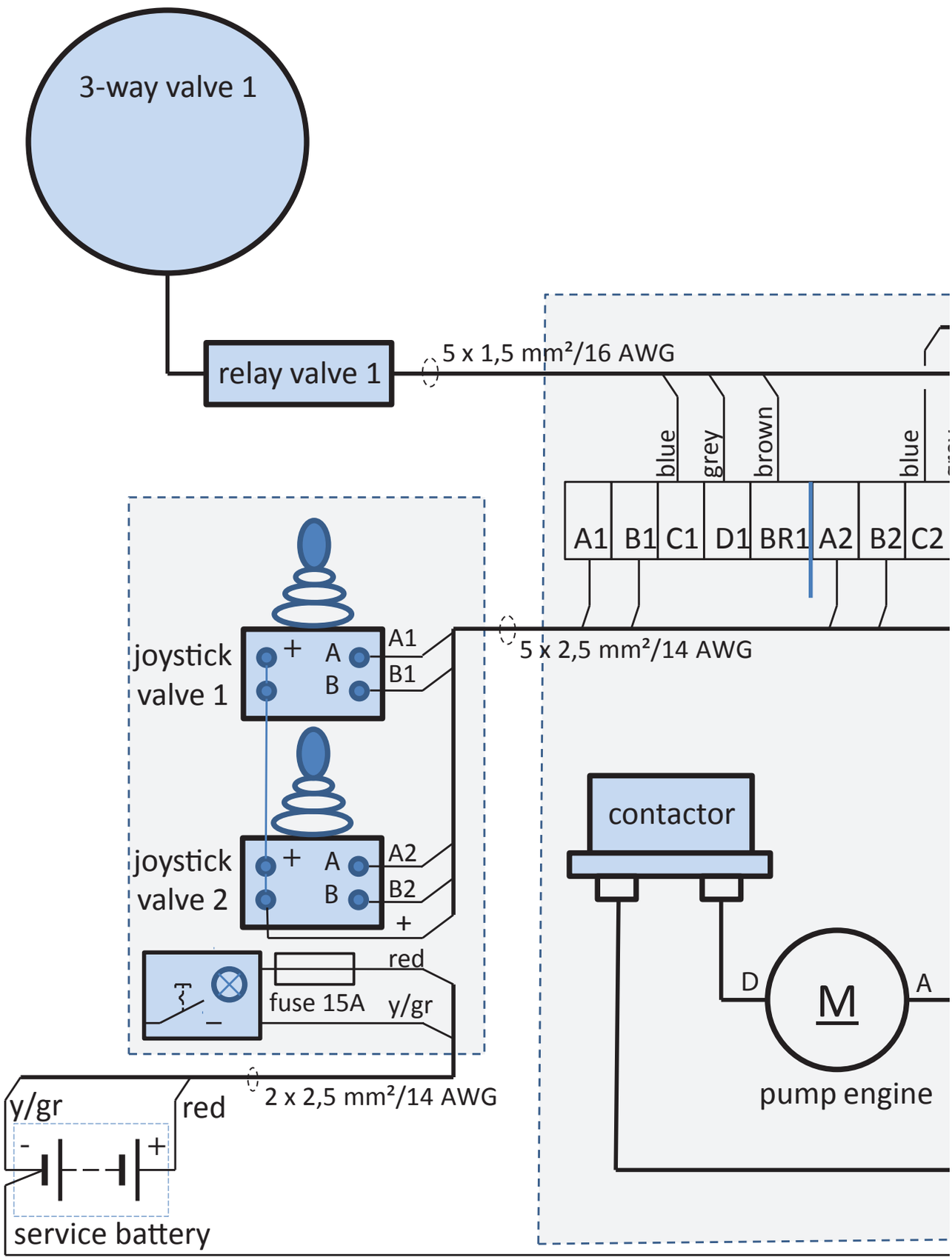
- Serie Parallel Switch / Electrical Air valve to: **G**

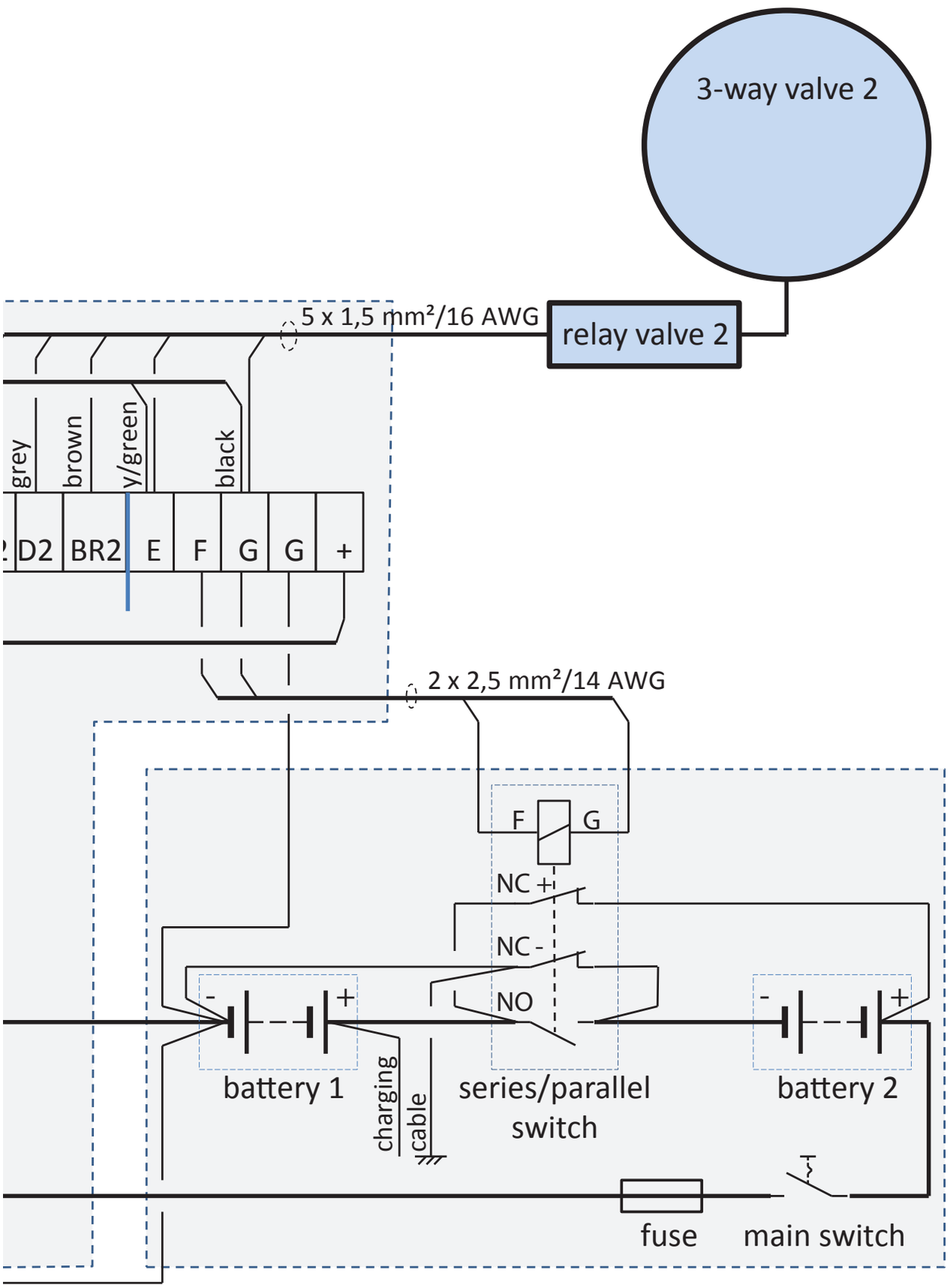


Relay unit Valve 1

Relay unit Valve 2

Electrical diagram Jet Thruster Combi




3-way valve 2
relay valve 2
5 x 1,5 mm²/16 AWG
grey
brown
y/green
black
D2
BR2
E
F
G
G
+
2 x 2,5 mm²/14 AWG
F
G
NC +
NC -
NO
-
+
-
+
battery 1
charging cable
series/parallel switch
battery 2
fuse
main switch

Jet Thruster Combi

How to adjust the Valve time relays:

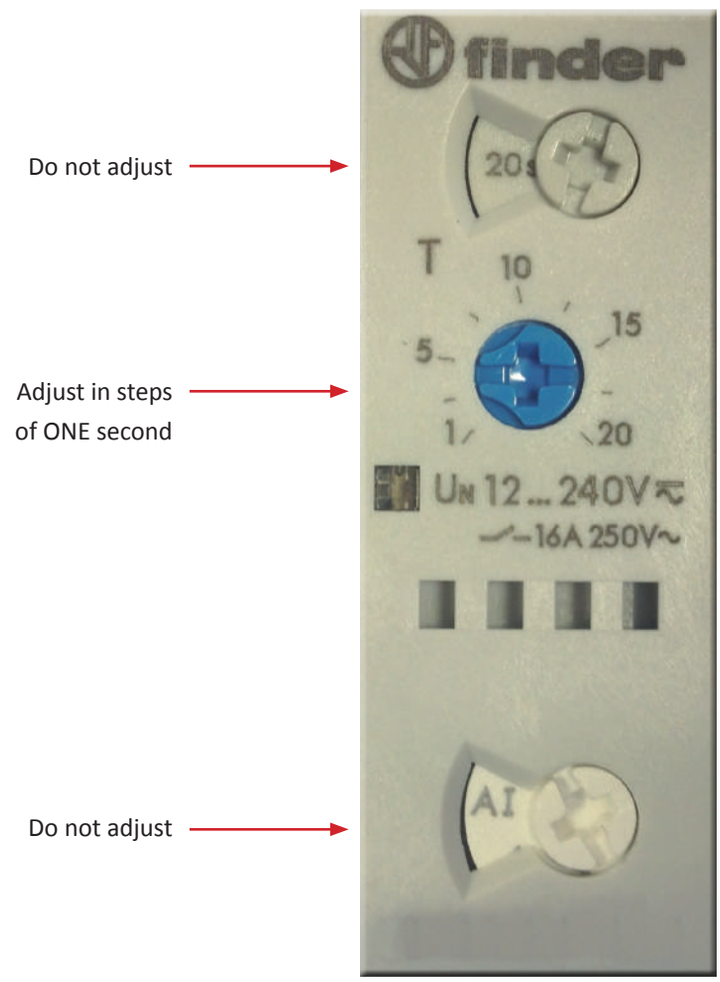
Note: Any valve that closes rapidly at the end of a pipeline will cause fluid hamer. To avoid this fluid hammer in the Jet Thruster Combi system, both valves are equipped with a time relay that keeps the valve open after the operator let go of the joystick. Built up water pressure, and the velocity of the water will be released before the valve will be automatically closed by the system.

Every Jet Thruster Combi installation is different, and therefore the timer relays **in the valve relay unit** have to be custom adjusted. The factory preset is 2 seconds.

Use a small screwdriver to make adjustments to the time relay that is in the Relay Unit Box which is attached to the Valve.

Note: *there has to be a minimum of 1 second between the bow and stern valve.*

Factory Valve closing delay preset:
One valve 2 seconds, other valve 3 seconds.
If adjustments are made, make sure to extend by increasing the delay for every valve by ONE second accordingly.



Valve relay unit time relay

Note:
Do NOT make adjustments to the similar relay on the pump unit.

Note:
Rapidly changing the thrust force from port to starboard or vice versa will cause fluid hammer in the Jet Thruster Combi system. The possible time to switch thrust to order side without fluid hammer will be different in every installation.
The operator of the Jet Thruster system has to be familiarized with the actual time to switch without hearing the fluid hammer.

When dual operated, (Bow and Stern Thruster at the same time) a fluid hammer can occur if one of the joysticks will be let go, or during the operation one valve is turned in opposite direction. The fluid hammer will be less because the water pressure is divided between bow and stern. The operator has to familiarize himself with this phenomena.

Series Parallel Switch

Air Release Valve

Dual Helm Joystick Setup

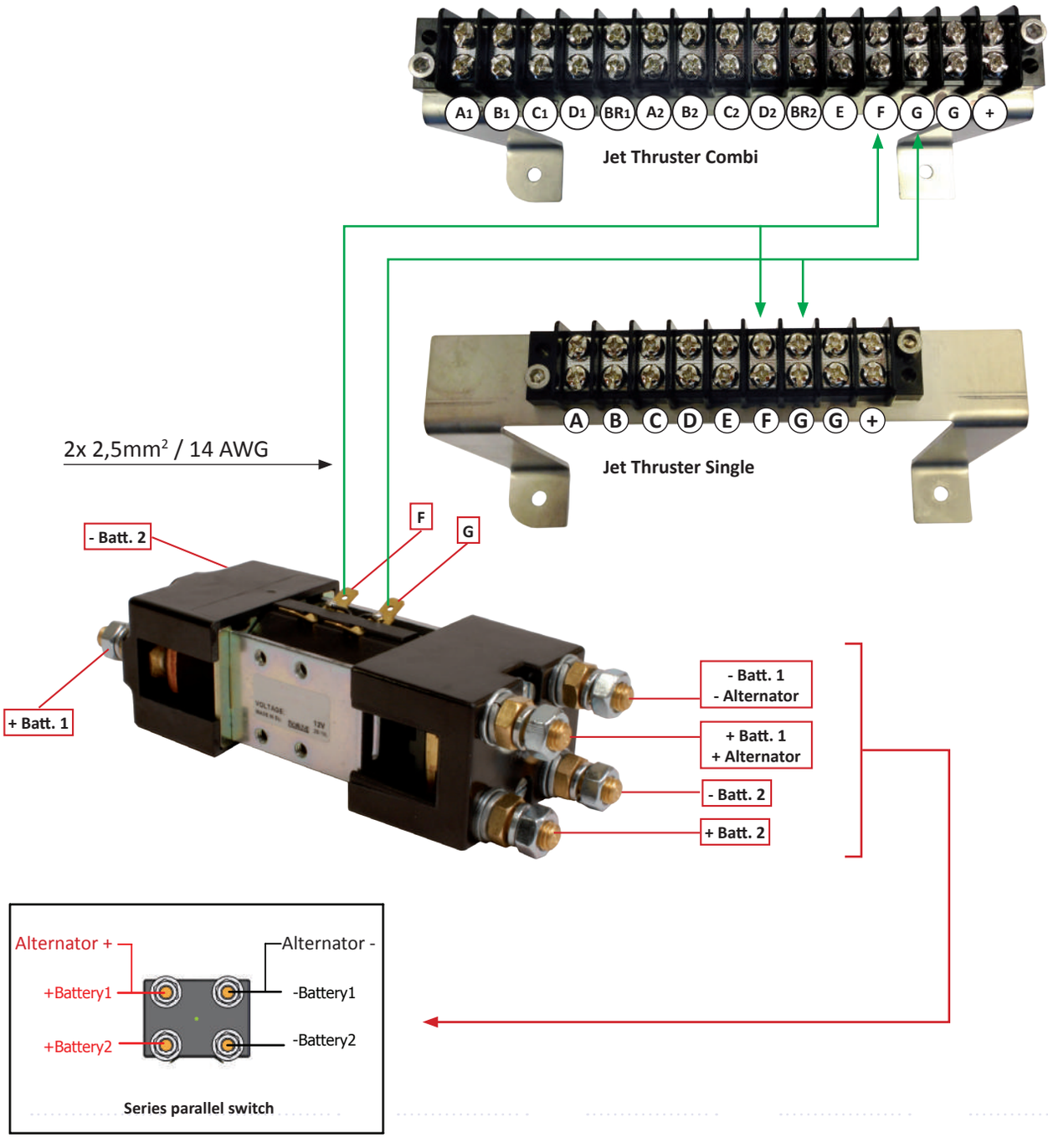
Series - parallel switch

The Series Parallel Switch creates a temporary 24V environment out of two 12V batteries to power the DC motor from the pump unit.

The switch itself operates at 12V. The moment the Jet Thruster system activates, 12V power activates the coil that makes the switch connects the battery cables. Automatically the connection will break if the Jet Thruster stops running.

- Connect F and G from the Series Parallel Switch with F and G at the pump unit. Use a 2x 2,5mm2 cable.

Note. If the Series Parallel Switch does not engages, the Jet Thruster will run at 12V. This implicates that less thrust force will be provided by the pump unit.

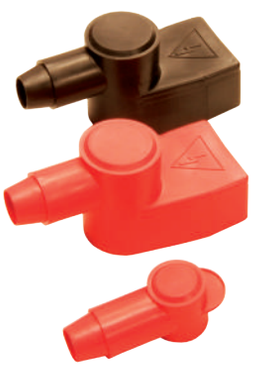


Connecting the series-parallel circuit

Attention!

Calculate the correct diameter for the battery cables to be applied.
Use a circuit that is AS SHORT AS POSSIBLE to prevent significant voltage loss.
The voltage drop should be no more than 5%. This means the batteries are to be placed as close as possible to the pump unit of the Jet Thruster.

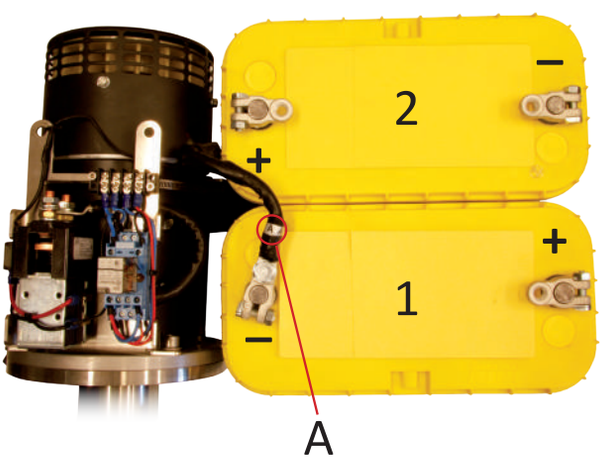
Holland Marine Parts advises the use of the Optima YellowTop battery. This battery has a high cold cranking amperage (CCA) and is suitable for deep discharge. Please visit our website for more information about this battery.



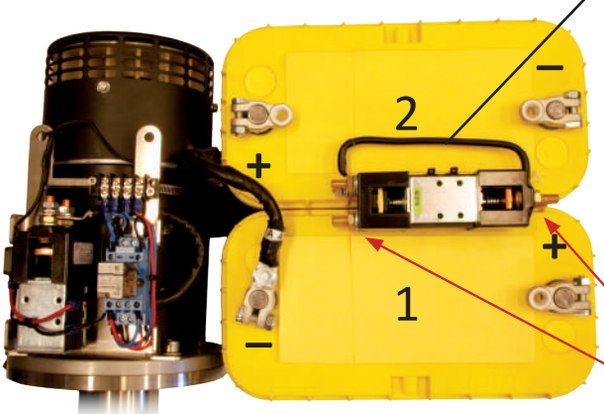
Slide the battery pole caps along the cables before attaching the battery terminals to the cables. This is no longer possible afterwards!

Two-pole side

Four-pole side



Step 1:
Connect the ground cable (marked ‘A’) from the pump unit to the negative pole of battery 1.

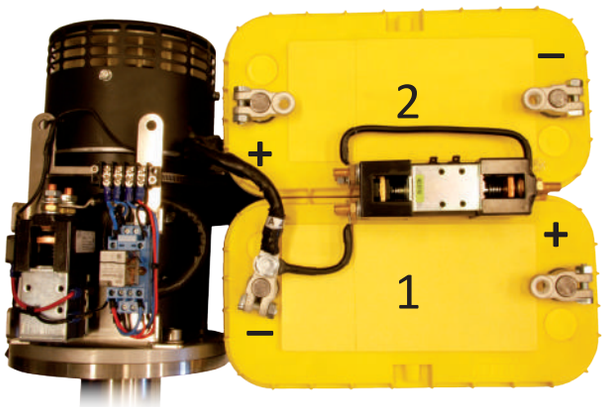


Cable replaced bya insulated copper strip (providedwith the series parallel swith)

Step 2:
Place the series-parallel circuit.
Make a bridge: Connect the ground cable at the bottom pole on the two-pole side to the bottom pole on the four-pole side.
A insulated copper strip is provided with the switch for this purpose.

two-pole side

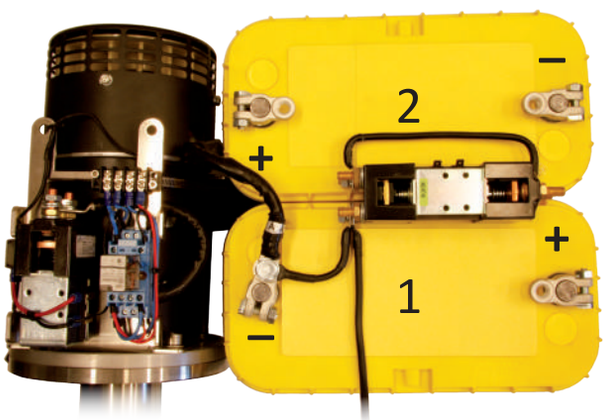
four-pole side



Step 3:

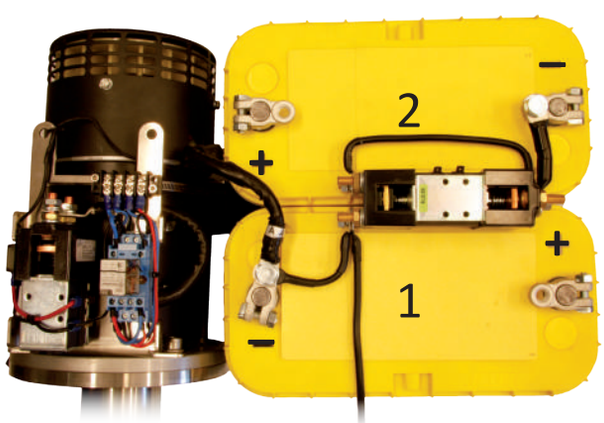
Connect the other bottom pole (four-pole side) with the negative pole of battery 1.

This cable diameter should be sufficient for a 12V charging current.



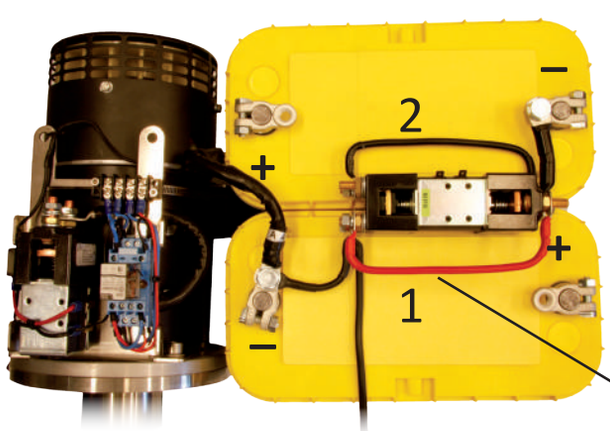
Step 4:
Connect the ground cable (negative battery 1) with the ground cable of the vessel.

This cable diameter should be sufficient for a 12V charging current.



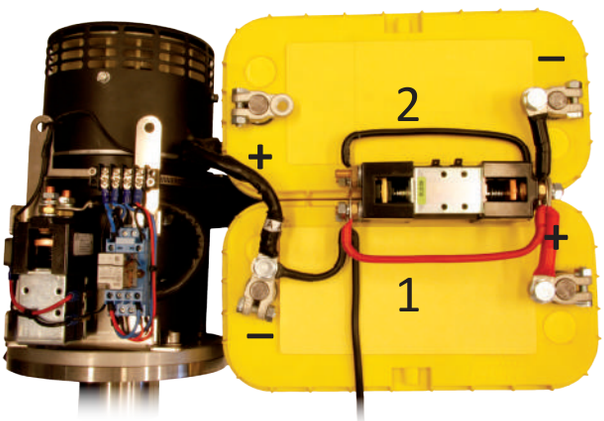
Step 5:
Connect the bottom pole (two-pole side) with the ground cable of battery 2.

*Use a cable type of a sufficient diameter. This cable conducts **24V** and needs to be able to handle the motor power.*



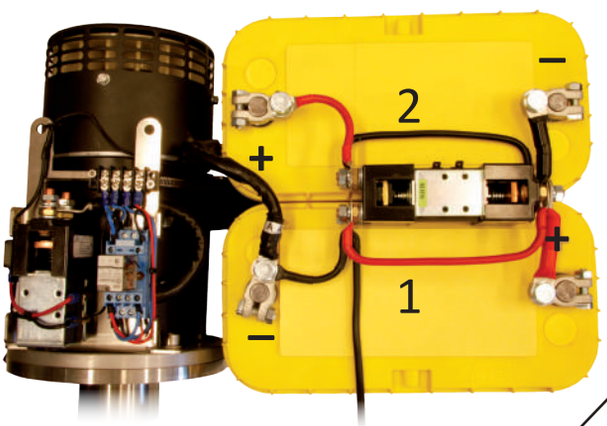
Step 6:
Make a bridge: Connect the copper strip to the two-pole side (top pole) to the top pole on the four-pole side.
A insulated copper strip is provided with the switch for this purpose.

Cable replaced bya insulated copper strip (providedwith the series parallel swith)



Step 7:
Connect the top pole (two-pole side) to the positive of battery 1. Use a cable type of a sufficient diameter.

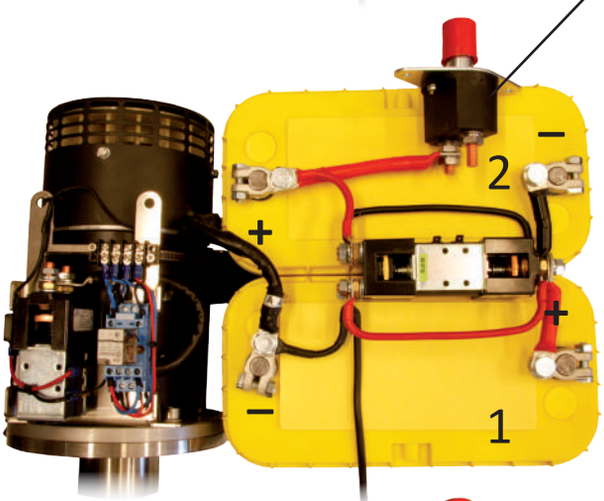
*This cable conducts **24V** and needs to be able to safely conduct the current.*



Step 8:
Connect the top pole (four-pole side) to the positive of battery 2.

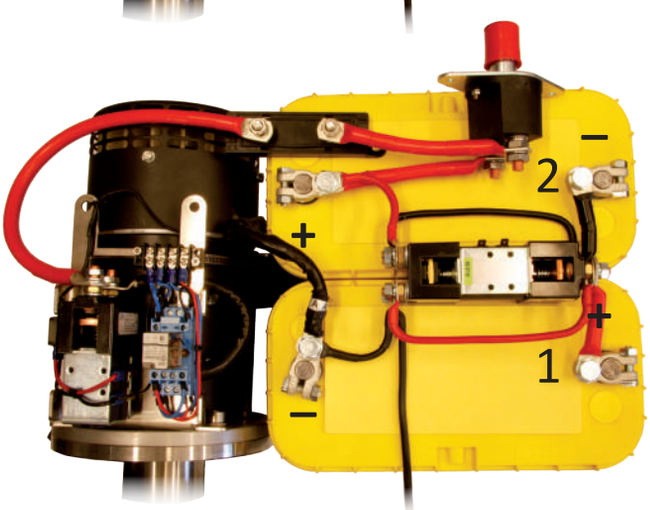
This cable diameter should be sufficient for a 12V charging current.

Holland Marine Parts
battery main switch
E-102-00



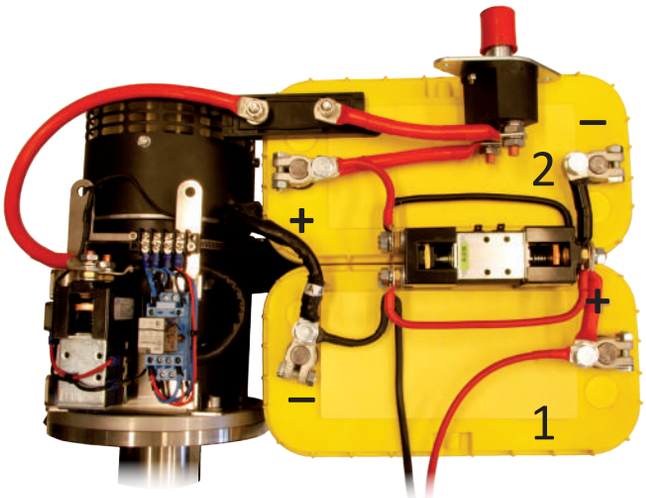
Step 9:
Place a reliable master switch as close between the batteries and the pump unit as possible.

*Use a cable type of a sufficient diameter. This cable conducts **24V** and needs to be able to safely conduct the current.*

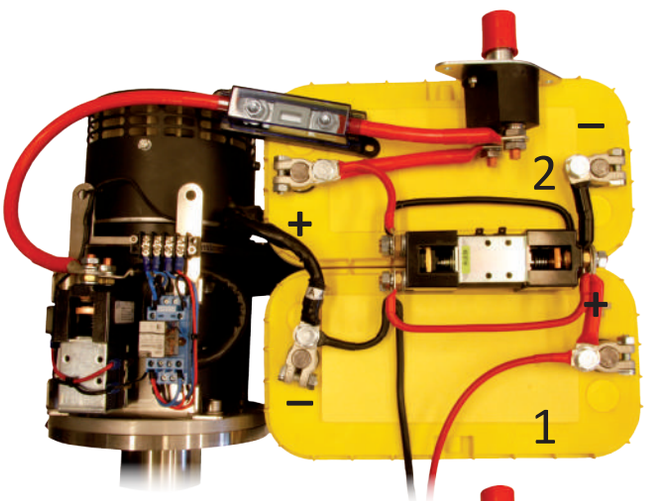


Step 10:
Connect the master switch to the pump unit with as short a cable as possible, and place this cable in the main fuse box.

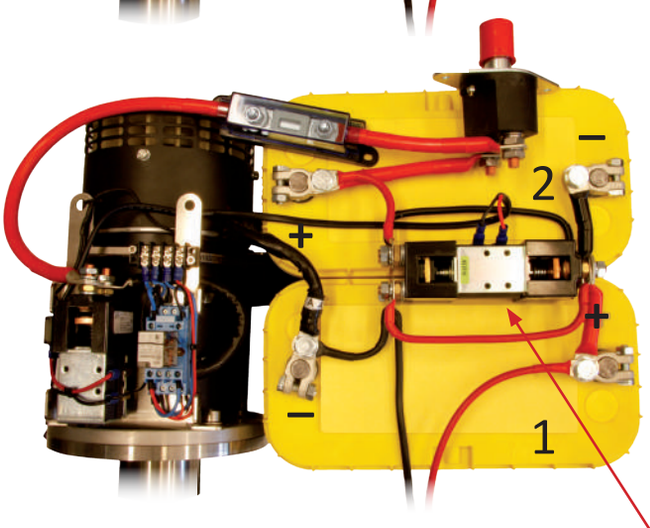
Do not place the fuse yet!



Step 11:
Connect the charging cable (sufficient diameter) from alternator/ battery charger/charging current distributor to the positive pole of battery 1.



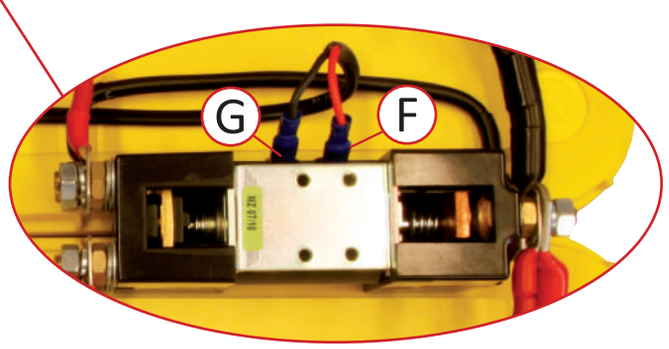
Step 12:
Check if all connections are firmly fixed, and the battery poles are equipped with battery pole caps and have been greased. Place the fuse and attach the fuse holder's protective cover.



Step 13:
Connect the control cable of the series-parallel circuit to the F and G ports. Screw connectors at the pump unit contactor support.

Step 14:
Check if the series-parallel circuit is switched on when controlling the Jet Thruster, and measure the voltage at the ground cable of the motor (cable A) and the positive pole at the contactor of the pump unit.

This should be 24V!

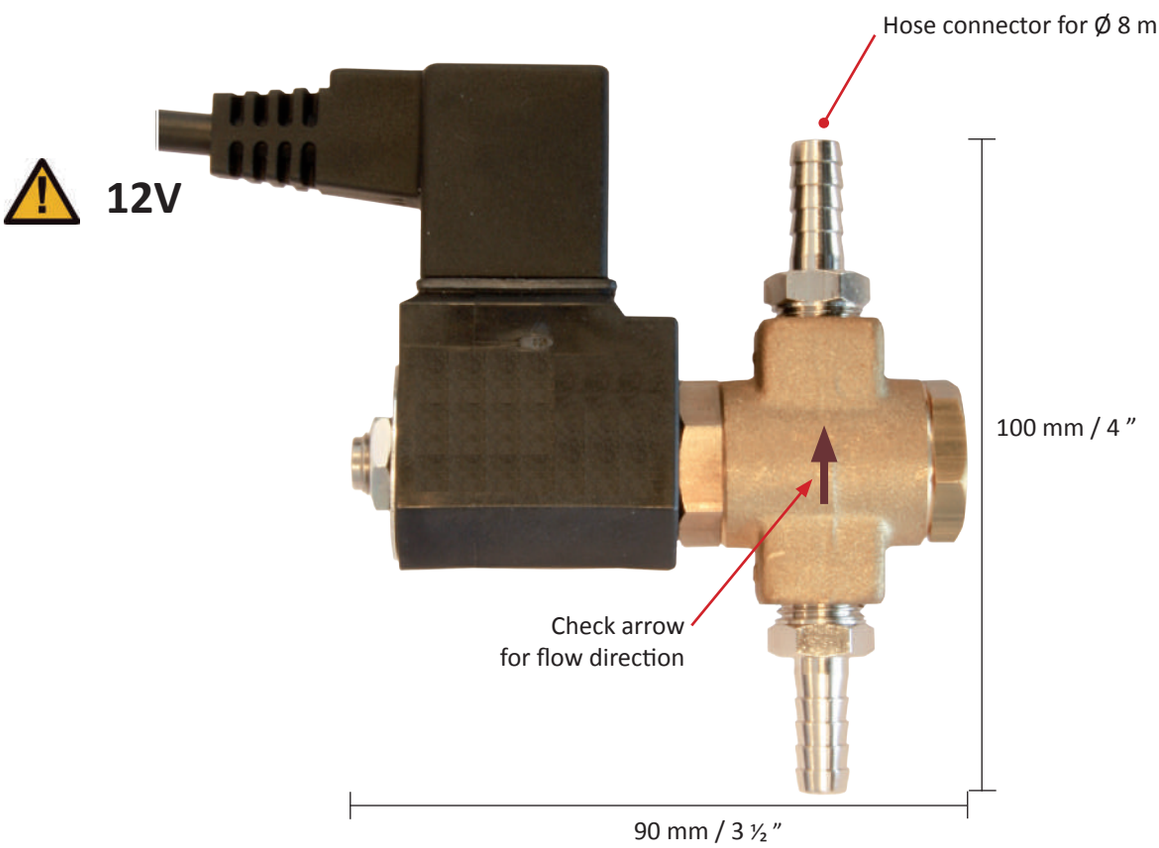


Installing the electrical air valve

Operation:

The pump head of the Jet Thruster system must be installed under the water line in order to prime this centrifugal pump. In some limited cases of fast moving vessels a vacuum can be produced when the nozzles rise above the waterline and the intake remains in the water. The suction under the fast moving hull will retract the present water from the Jet Thruster system. When the boat slows down or stops the water will automatically flow into the system due to the fact that the pump head and nozzles are under the waterline.

However, it is possible that an air pocket can be trapped in the pump head preventing the pump from self priming. In this unique situation an Electrical Air valve can be installed, this will release the present air from the pump head allowing the pump to rapidly prime. Giving the operator immediate thrust pressure for maneuvering.

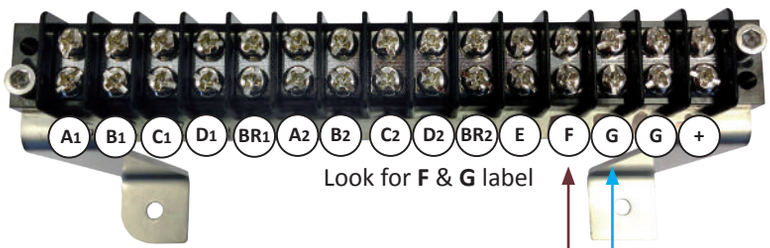


How to install the Electrical Air Valve:

A. Remove the winterization plug located on the pump outlet fitting. Ⓐ
B. Install the provided ⅛ hose connector.
C. Make sure to install the Electrical Air Valve above the waterline!
D. Apply the supplied flexible hose and hose clamps between the pump unit and Electrical Air Valve.
E. Apply the supplied flexible hose from the Air valve to outside of the vessel. In case of a technical failure, water that comes from the pump unit when the Jet Thruster system is engaged, will be pumped outside the vessel.

Follow diagram complete the electrical installation.

Terminal at pump unit
Jet Thruster Combi



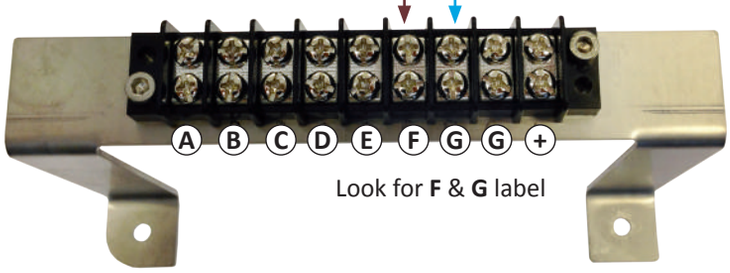
Look for **F** & **G** label

air leading
out of vessel

- Blue ground
- Brown 12V Ⓕ
- Yellow/green not in use

X

Terminal at pump unit
Jet Thruster Single

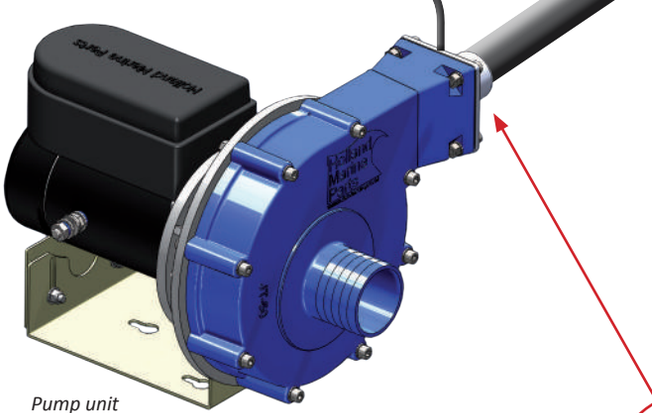


Look for **F** & **G** label

Position of electrical valve
must be above water line.

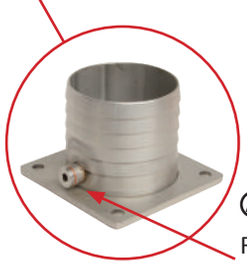
Flexible hose, Ø 8mm

Water to 3-way valve/nozzle



Pump unit

Select applied contactor support and position of **F (+12V)** and **G (Ground)** according to the pump unit the installation is applied for. See appendices for additional information.



Ⓐ

Remove plug from pump outlet
to connect flexible hose.

Electrical diagram for connecting Single and Dual joystick control

Use a service battery to power the Joystick. Do not use a dedicated Jet Thruster battery to power the Joystick Panel. Do not operate both joystick units in a dual helm setup at the same time.

Step 1: For the installation of the joystick + front plate; drill a hole **70 mm (2 3/4")** in diameter, 2x for combi joystick (overlapping).

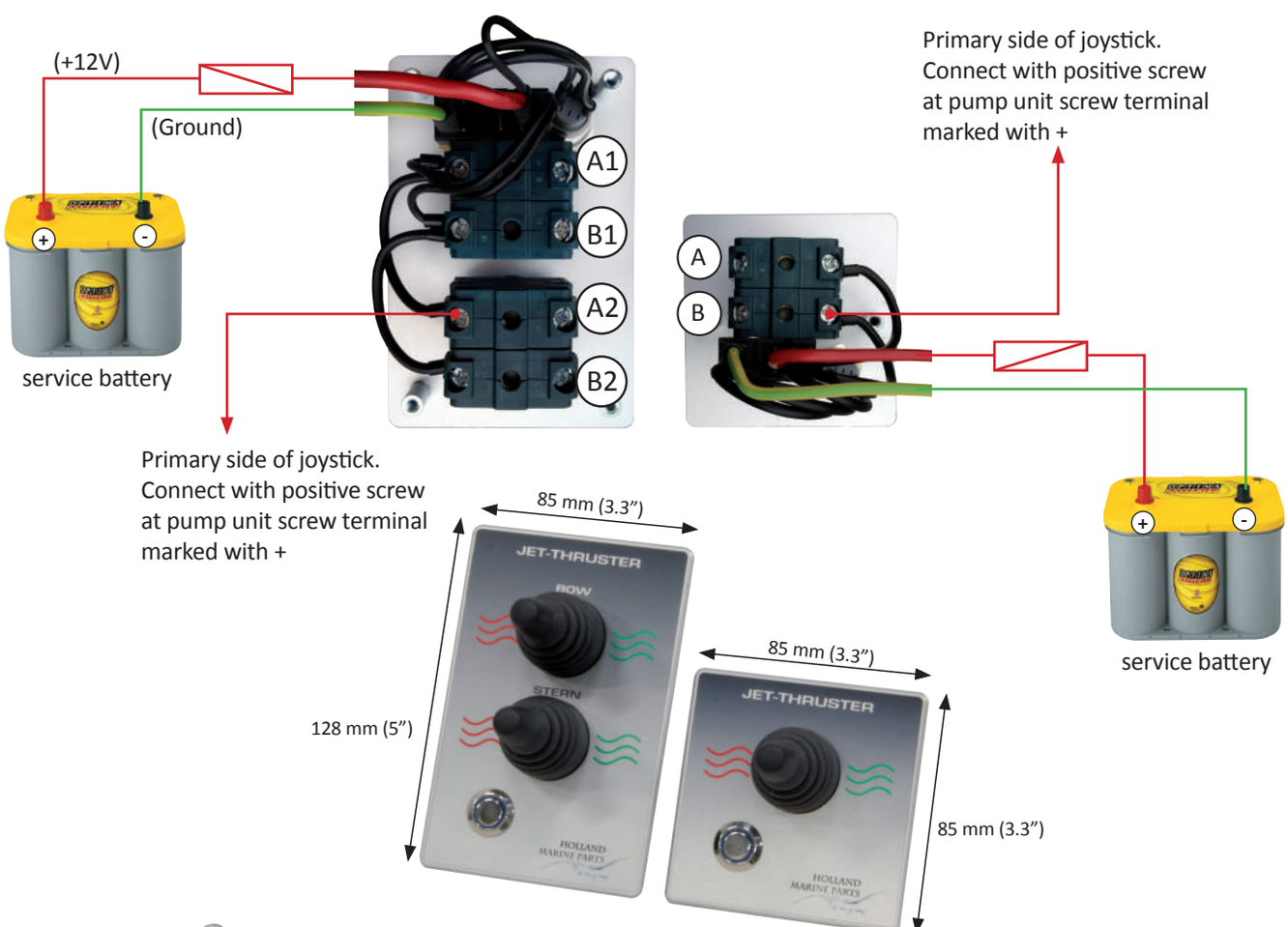
Step 2: Connect the **+** cable (red) of the joystick (with fuse 15A) to the 12V ignition switch or a control panel and connect the ground wire (green/yellow) to the ground of the ship's circuit.

Do not use the dedicated battery that powers the electrical motor of the pump unit to power the control circuit of the Jet Thruster!

The joystick operates on 12V, for vessels with a 24V installation a dc-dc converter must be applied.

Step 3: **JT Single:** Pull one cable* (3x2.5mm², 14 AWG) from the joystick to the actuator support on the pump unit. Connect this cable with the screw connectors on both the actuator support on the joystick and the pump unit, marked **A and B.**
*Jet Thruster Combi: 5x2.5mm² (14 AWG)
Connect the primary side of the green Elfin joystick contact with the srew connector marked with **+** at the contactor support on the pump unit.

Note: In case of **Dual helm setup**, repeat step 1-3 to install **a second Joystick control** => The wire pairs **AB** from Joystick 1, and **AB** from Joystick 2, have to be connected with the **AB** connection to Contactor support at the Pump unit.



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Holland Marine Parts
Heijningen

Report

Inspection and Maintenance Jet Thrusters

Materials Selection and Corrosion

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214065

Revision No.
00

Revision Date
17 July 2014

Author/signature	Verifier/signature	Revision Number	Date
		03	
		02	
		01	26 juni 2014
Ing. Jan J.M. Heselmans	Esther de Valck	00	20 mei 2014

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Scope of Work

Holland Marine Parts Jet Thrusters have been made of corrosion resistant alloys. However, under extreme conditions corrosion problems might occur. For this reasons it's important that a regular inspection is done.

This report will describe which type of corrosion might occur on which locations. And how to inspect on corrosion.

Materials Selection and Possible Corrosion Mechanism

1.1 Nozzles

The nozzles have been made of cast alloy 1.4408. This is a 316 type stainless steel (19 Cr, 10 Ni and 2 Mo). In seawater and brackish water, 1.4408 may corrode by pitting corrosion and crevice corrosion on the threading with the valves. The pitting corrosion might be accelerated by MIC (Microbiological Influenced Corrosion). MIC mainly occurs at higher temperatures of the water, during summer time or in (sub)tropical waters.

1.2 Valves

The valves have been made of brass alloy Cu58Zn38 and have been coated with a Chromium layer of 2-3 µm thickness. Such valves are suitable for ships in marine conditions (seawater condition). Corrosion might occur if the chromium layer has been damaged or has been worn out.

1.3 Galvanic corrosion Nozzles/Valves

Galvanic corrosion between nozzles and valves is unlikely. Both have the same rest potential (same nobleness). Both contain a surface layer of chromium oxides.

1.4 Pump unit

The pump house has been made of a plastic with a stainless steel back sheet. The impeller (JT70 and JT90) has been made of a bronze cast alloy. In well conducting waters, such as seawater, galvanic corrosion of the pump impeller caused by the stainless steel back sheet is possible. (JT30 and JT50 have non corrosive composite impeller)

Maintenance and Inspection

All parts have been made of corrosion resistant materials. However under extreme conditions corrosion is possible. For that reason we advice an inspection interval of 6 month.

1.5 Nozzles

Inspect the nozzles once every six month on corrosion and fouling from the outside of the vessel. If corrosion or fouling can be seen, remove it with a brush and inspect the surface (and welds if applicable) again on pitting corrosion.

1.6 Valves/Nozzles Threading

Inspect once every six month the threading of the couplings on leakages. If leakages are found, possibly crevice corrosion of the threading occurs. Loose the coupling and inspect it on corrosion of the threading's internal and external.

1.7 Pump

During longer stand still periods it is recommended to store the pump internals in air, or in fresh water. If seawater or brackish water is in the pump for a longer time (month), we recommend to inspect the impeller on corrosion problems.

Frequently Asked Questions (faq)

Q: For the nozzles: Can a coating help to avoid corrosion?
A: Yes, a coating can help on the external part. Internally the nozzles cannot be coated as the water flow is too high. A coating will loosen from the stainless steel surface.

Q: How should stainless steel be coated?
A: Stainless steel can be coated, but the adhesion of the coating always will be less good compared to carbon steel. The coating procedure is similar to carbon steel:

1. Proper surface preparation by grid blasting. High roughness is of great importance.
2. The surface must be completely clean, particularly free of chlorides (salt).
3. Use several layers of (primer) epoxy, according to marine coating specs.

Q: What protection will polishing the stainless steel surface guarantee?
A: Polishing always is good for two reasons:

1. Corrosion resistance will improve.
2. Biofouling and MIC will be reduced.

Q: Can biofouling promote corrosion, such as crevice corrosion or MIC?
A: Yes, biofouling preferably must be removed.

Q: How can pitting corrosion be repaired?
A: If the pits are not deep, the can be grinded out smoothly succeeded by polishing the surface. If the pits are deep, the need to be welded and the surface must be grinded again.

Q: How can crevice corrosion be repaired?
A: If the corrosion is not deep, the can be grinded out smoothly succeeded by polishing the surface. If the pits are deep, they need to be welded and the surface must be grinded again.

Q: How can MIC be stopped?
A: MIC is a biofilm problem. The biofilm is bio fouling, or a slimy layer of micro organism. MIC can be stopped by removing the fouling and biofim. I.e. by cleaning the surface.

Q: Can 'free iron', or 'iron oxide' cause corrosion to stainless steel?
A: Yes, this should be avoided. For example, don't grind steel near stainless steels.

Q: How can a contaminated or activated stainless steel surface be repaired?
A: This can be done with a 'pickling and passivation' paste. Be careful, this are toxic acids (containing Hydrogen Fluoride). Read manual carefully, take safety precautions. Be careful with acids on other materials such as marble. Always rinse all acids out using clean tap water.

Q: Can stainless steel be protected with sacrificial anodes (Zinc or Aluminium)?
A: Yes, cathodic protection will stop the corrosion of stainless steel. If the nozzles are contacted with the steel hull, the anodes on the hull will protect the nozzles (if anodes are present). It will not be possible to attach anodes to the nozzles if they are insulated in a GRP (polyester and other) hull.

Q: Can galvanic corrosion cause corrosion to the stainless steel nozzles?
A: Normally not because stainless steel is high (noble) in the galvanic range. If stainless steel is connected to carbon steel, the ignoble carbon steel will corrode, and the noble stainless steel will be cathodically protected by the steel.

Q: Can stray currents cause corrosion to the nozzles?
A: Only if the stray current runs through the water from one electrode to the other one (the nozzle). An electrical circuit must be drawn in order to explain this. Stray currents causing corrosion are rare.

Jet Thruster valve test rapport

3- way valve

serial number

V-100-00: ❑

V-200-00: ❑

V-101-00: ❑

V-202-00: ❑

Jet Thruster test rapport

Testdate:

HMP No:

JTS-30-00: ❑ JTC-30-00: ❑

JTS-50-00: ❑ JTC-50-00: ❑

JTS-70-00: ❑ JTC-70-00: ❑

JTS-90-00: ❑ JTC-90-00: ❑

OK:

Name :

Signature:

❑

JT-30 / JT-50

pos. 1

Serial No:

❑

JT-30 / JT-50

pos. 2

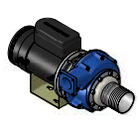
Serial No:

❑

JT-70 / JT-90

pos. 1

Serial No:



❑

JT-70 / JT-90

pos. 2

Serial No:

Notes

Project info

Owner: . . . . . .

Adress: . . . . . .

Boat type: . . . . . .

Build by: . . . . . .

CIN code: . . . . . .

Date of installation: . . . . . .

Date of system activation: . . . . . .

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Date OK: Name : Signature / stamp:

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HOLLAND
MARINE PARTS
WE KEEP YOU MOVING!

GENERAL COMMERCIAL TERMS AND CONDITIONS

General Commercial Terms and Conditions of
Holland Marine Parts B.V.
Donker Duyvisweg 297
3316 BL Dordrecht
The Netherlands

I Applicability of the Present General Terms and Conditions

1. The present General Terms and Conditions shall apply to all offers and to all agreements concerning engines, machines and components. Unless the opposite appears explicitly, the present General Terms and Conditions shall equally apply to the assembly, disassembly, repair and other activities. The General Terms and Conditions of the customer shall not be binding on us, unless we have agreed to the contrary in writing.
2. The stipulations of the present General Terms and Conditions shall always remain in force, unless otherwise agreed upon in writing.
3. Each and every assignment or offer given orally or in writing by staff in the service of the contracting party, be they authorised to do so or not, on behalf of the contracting party, shall be binding on the contracting party. If the contracting party is not bound, then the party that concluded the agreement is deemed to be the contracting party.
4. In the present General Terms and Conditions “us” and “we” shall always refer to Holland Marine Parts B.V., whereas contracting party shall refer to our other party.
5. The nullity or annubility of any clause in the present General Terms and Conditions shall not prejudice the validity of the other clauses.

II Offer and Confirmation of the Order

1. Our offers shall be without obligation in every respect, unless explicitly stated otherwise. We shall only be bound, having due regard to the stipulations hereinafter in the present General Terms and Conditions, when we have confirmed the order in writing. The same shall apply to potential additions and/or changes to the order.
2. The text of our order confirmation shall determine the contents of the order. Arrangements or agreements with employees shall not be binding on us, to the extent they have not been confirmed in writing by us.
3. All technical data can only be deemed to have been given to the contracting party as an approximation.
4. All drawings, illustrations, dimensions and weights given, shall remain our property under explicit reservation of copyrights and patent rights. Subject to our consent in writing, the contracting party shall not be allowed to copy said documents, to make them available for inspection to any third party or to make them otherwise available to any such third party. The contracting party shall hold us harmless against claims of third parties, including all extra judicial and judicial costs, that we have to make or pay to claimants, if the contracting party violates the provisions of this subsection.

III. Prices and Packaging

1. Unless otherwise agreed upon in writing, prices shall be based on delivery at our enterprise in Dordrecht (ex Works).
2. The prices given, shall be exclusive of value added tax, unless stated otherwise.
3. If so required, packaging shall be charged at cost price and shall not be taken back. The decision as to the necessity to use packaging or not shall be made at our sole discretion.
4. If there are any changes in price, currency fluctuations, devaluation or revaluation of the Euro compared to any foreign currency or any changes to salaries, import duties or other taxes, social contributions or government levies, freight, etc., even if these changes occur due to circumstances that could already have been foreseen when the offer was made or accepted in writing, we shall be entitled to modify the sales prices and the costs for assembly, disassembly, repair and other costs, accordingly.

IV Delivery and Delivery Period

1. Goods shall be delivered at our enterprise in Dordrecht (ex Works). Delivery periods shall be determined approximately.
2. The delivery period shall commence when we have confirmed the order in writing, when all formalities required to start the activities have been complied with, when all necessary documents are in our possession and when the contracting party has provided us with all the data concerning the order. In the event of instalments, the delivery period shall only commence following receipt of the first instalment.
3. The delivery period shall be determined on the assumption that the necessary materials in the broadest sense of the word, be delivered to us in due time.
4. Exceeding the delivery period can never lead to any claim to damages, not even following a notice of default.
5. With respect to the delivery period, the goods shall be deemed to have been delivered when they are ready at our enterprise in Dordrecht and/or at the location referred to in our order confirmation and/or are made available at another location to be specified, all this after we have informed the contracting party thereof in writing. If we have accepted to assemble the goods, the goods shall be deemed to have been delivered in respect of the delivery period, when they have been made available at the place of delivery agreed upon.
6. From the moment the goods are deemed to have been delivered by virtue of section 5 of the present article, the risk of all direct and indirect damage to or in connection with said goods, sustained by the contracting party, shall be for the latter's account.

V. Transport

1. From the moment they are shipped by or to us, all goods and materials shall be transported for the risk of the contracting party. Even in the case delivery carriage paid has been agreed upon, the contracting party shall be liable for all damage (such as damage caused by transport, fire and water, theft or embezzlement) to the goods during transport. The contracting party shall be under the obligation to take out an insurance to cover said risk, with the exclusion of recourse by the insurer(s) against us, our employees and/or supporting personnel.
2. The contracting party shall have to verify the condition the goods are in upon their arrival.
3. Without prejudice to the above, we shall not be liable for any damage whatsoever caused to the goods or not in connection with the transport.

VI Assembly

1. Unless otherwise agreed upon in writing, the assembly of the goods shall not be included in the delivery.
2. If an order to assemble the goods is given without a complete listing in writing of the activities the contracting party wants us to carry out, and if such activities are equally not referred to in the order confirmation, the agreement shall be deemed to include the activities we deem necessary.
3. The staff charged by us with the assembly, shall limit themselves to the assembly of the material supplied by us and/or the material that was included in the order. We shall not be responsible for assembly or repair work beyond the scope of the agreement or for any work done by third parties to materials, machines and/or machine components delivered by us.
4. When, through no fault of ours, the assembly work cannot be arranged for or done without interruption or is delayed in any other way, we shall be entitled to charge on the corresponding additional costs to the contracting party at the normal rate.
5. All potentially extra costs shall be for the account of the contracting party, more in particular:
   a travel and accommodation expenses and cost of living of the technician(s);
   b costs arising due to the fact that the assembly work cannot be done during usual day hours.
6. Upon completion of the assembly and when the goods have been put into operation, the assembly shall be deemed to have been carried out properly.
7. If the contracting party wishes to call on our services after assembly of the goods and after they have been put into operation or afterwards wishes to call in our assistance to inspect the goods sold / delivered, we shall be entitled to a reimbursement of expenses at the usual rate, to be increased by travel and accommodation expenses.

VII Liability

1. Neither we, nor our employees and/or our supporting personnel, shall be liable for any damage whatsoever, be it direct or indirect, regarding work done in the broadest sense of the word or regarding goods delivered pursuant to the agreements to which the present General Terms and Conditions apply.
2. Without prejudice to the stipulations of section 1, we shall only be liable for damage if the contracting party proves that the damage is due to gross negligence or intent on the part of the directors of Holland Marine Parts B.V.. We shall not indemnify the contracting party against gross negligence or intent on the part of our personnel or our supporting personnel, neither shall we indemnify the contracting party vis à vis any third party. Damage that has not been established by an expert appointed by us, shall never be considered to be damage. Under no circumstances shall we be liable for any kind of indirect damage whatsoever, no matter by whom such damage is sustained, including in particular consequential loss and/or the loss of time.
3. The contracting party shall be liable for all damage sustained by us or by our subordinates or supporting personnel, caused through the fault of the contracting party, including but not limited to, damage resulting from defects to or the nature of the goods delivered or made available by the contracting party, or otherwise due to circumstances which are reasonably for the risk of the contracting party.
4. The contracting party shall be under the obligation to state special characteristics or characteristics that pose a risk, of material made available by the contracting party, without such statement releasing the contracting party from the liability resulting from section 3 and the contracting party shall be under the obligation to indemnify us at its expense against all claims or titles of third parties and the consequences thereof, including measures to seize property before judgement.

5. The contracting party shall have to forthwith inform us of shortcomings or defects to repairs or deliveries that have been discovered, at any rate not later than three working days from the day the shortcoming or defect was discovered, and to do all that is necessary to limit the damage, all this under penalty of the loss of any right to damages or warranty..
6. If the contracting party wants to carry out an expert's appraisal (have such carried out), it shall have to inform us thereof in due time in order to enable the latter to be present, together with the latter's own experts or not, all this under penalty of the loss of any right to damages or warranty.
7. Notwithstanding any other provision, our liability shall never exceed a maximum of (25.000) twenty five thousand Euros.

VIII Warranties

1. Having due regard to the restrictions to be listed hereinafter, we shall undertake to repair or replace the new engines or machines we have delivered, which show a defect within a period of 24 months from the day of delivery as referred to in article IV, provided the defect is forthwith reported to us by telephone or in writing and provided that the defect is caused solely by faulty material or a faulty construction. The warranty shall not apply if the goods malfunction due to other causes such as normal wear and tear, unsuited kinds of fuel, lubricants, sealing and insulation material, measuring equipment, overloading, poor foundations, aggressive cooling water, faulty air supply, faulty piping, incorrect conduits, improper handling or accidents as well as in those cases in which the cause is not evident beyond doubt. The obligations under warranty do not comprise the burden to carry costs of cranage, electricity, docking, diving, dismounting, or travel and boarding costs.

2. With respect to the assembly, disassembly, repair and other work done by us, a warranty shall only be given for the reliability of the execution of the work done, unless explicitly otherwise agreed upon.
3. The obligations under the warranty shall lapse if the contracting party has made any changes or has done any repair work to the goods delivered on its own initiative during the term of warranty, or has had such done by a third party, or if, in our opinion, the contracting party has failed to properly service the goods delivered.
4. None of the indirect or direct damage, including consequential damage, sustained due to the malfunctioning of the goods delivered, shall be compensated.
5. We shall not be held to fulfil any obligation under the warranty if the contracting party fails to comply in a proper or timely manner with its obligation to pay or with any other obligation that might result from any agreement the contracting party has concluded with us.
6. No warranty shall be given for used engines, machines and components, unless explicitly agreed upon otherwise.
7. The warranty given on engines, machines and components purchased from third parties, shall not exceed the warranty given to us by our supplier(s).
8. The fact that obligations under the warranty may still exist on our part, shall not entitle the contracting party to postpone any payment, no matter what such payment is intended to cover.
9. Goods in respect of which warranty claims are lodged have to be shipped carriage paid. Components that are replaced shall become our property.
10. The warranty period in respect of goods which have been repaired or replaced under the warranty shall be three (3) months from the date of repair or replacement, or until the expiration date of the original warranty period of those goods.
11. All stipulations set out hereinabove and to be set out hereinafter, shall apply to the activities to be carried out by us under the present warranty clause. The warranty as set forth in this clause is the only warranty for the goods or services supplied, and replaces expressly any other warranty or claim, express or implied, whether in law or in contract. The contracting party waives all other further-reaching rights, whether from law or from contract.

IX Conditions of Payment

1. Payment of engines, machines, components, assembly, repairs and other activities shall have to be made in cash upon delivery, completion respectively, unless otherwise agreed upon in writing.
2. Delivery, completion respectively, as referred to in the first section of the present article, shall be understood to be:
   a. with respect to engines and machines, the moment they are made available in our enterprise in Dordrecht and/or at the location stated in the order confirmation, or at another storage location of our choice to be specified;
   b. with respect to components, the moment they leave our warehouses, or are kept ready in them for shipment respectively;
   c. with respect to assembly and repairs, the moment the work is finished in our opinion;
   d. expenses we advance that are for the account of the contracting party, shall be settled in conformity with the stipulations of section 1 of the present article.
3. We shall reserve the right to demand interim payments and/or, in our opinion, valid securities for the delivery of engines and/or machines as well as for assembly work, repairs and other services. The refusal on the part of the contracting party to furnish the security required, shall entitle us to dissolve the agreement by means of a written statement, without prejudice to our rights to compensation of expenses and loss of profits as well as of all other damage.
4. All payments shall have to be made without any deduction or set-off, either at our offices in Dordrecht, or by transfer into a bank account to be specified by us, unless explicitly otherwise agreed upon.
5. Complaints (each and every claim further to any alleged delivery deviating from the contract) concerning the execution of work or deliveries as well as invoices, shall have to be filed in writing by registered letter under penalty of nullity of the complaint concerned, within 8 days from completion or delivery of the work or the good concerned or from the day the invoices were sent. Complaints shall not suspend the contracting party's obligation(s) to pay.

6. If the contracting party is in default with the payment, it shall be deemed to be in default by operation of law and we shall have the right without any notice of default, to charge an interest on the entire amount due still outstanding, equalling the statutory commercial interest increased by 3% on an annual basis commencing on the date the payment concerned becomes due and payable, or, in the case of instalments, commencing on the day the term of the instalment concerned expires, and furthermore to recover all collection costs, both the judicial and extrajudical costs, from the contracting party, all this without prejudice to the other rights vested in us. The extrajudicial collection costs shall amount to 15% of the principal with a minimum of EURO 250.-.
7. All of the delivered goods shall remain our property until they have been paid in full. As long as payment in full has not yet been made, the contracting party shall not be entitled without our consent in writing to that effect, to dispose of the goods in any way whatsoever. In order to be able to exercise our property rights, the contracting party shall be under the obligation if it wishes to establish any mortgage right, right of pledge or any other restricted right to any immovable property, registered good or movable property for which the goods to be delivered by us are intended, to first inform the creditor that the goods delivered are still our property and that a mortgage right, right of pledge or any other restricted right first requires our consent in writing.

X Retention of Title

1. Up to the moment the contracting party has paid our claim concerning the goods delivered and/or the work done in full, the goods delivered, be they processed or not, shall remain our exclusive property for the account and the risk of the contracting party.
2. The contracting party shall not be authorised to give said goods as collateral, to let them or to transfer title to them to any third party.
3. If goods are taken back, we shall reserve the right to claim all damage, loss of profits and interest.
4. The contracting party shall be under the obligation to forthwith notify us of the fact that third parties enforce rights to goods falling under the retention of title pursuant to the present article.
5. If it is shown at any point in time that the contracting party has failed to fulfil any of aforementioned obligations, the contracting party shall owe a penalty to the amount of 15% of the unpaid part of the purchase price or the work done, without prejudice to the right to damages.

XI Dissolution / Cancellation

1. Each and every failure to comply with any obligation on the part of the contracting party, shall entitle us to dissolve the agreement(s) by means of a mere written statement, without prejudice to our right to damages. At our own discretion, we shall always be able to demand compliance with the agreement(s), without prejudice to the right to damages. Failure to comply with any obligation shall also count as a resolutory condition which we can invoke in writing at our own discretion, without prejudice to our right to claim compensation for all damage.
2. The contracting party shall waive all rights to dissolution of the agreement, unless cancellation of the agreement in conformity with the stipulations of section 3 of the present article is agreed upon.
3. The contracting party shall only be able to cancel the agreement if we consent to it. In that event, the contracting party shall owe us a compensation to the amount of 15% of the contracting / purchase price (exclusive of VAT), unless the damage, which shall include the costs and the loss of profits, exceeds 15% of the contracting / purchase price (exclusive of VAT), in which case the compensation shall cover the total amount of damage, interest and costs. In the event the agreement is cancelled, the contracting party cannot lay claim to anything that we have already done and everything that we have already done shall have to be undone at the expense of the contracting party, all this at our discretion.

XII Purchase Conditions

1. If and in so far as we, as a buyer, are bound, the following conditions shall apply instead of the stipulations of III, IV, VI and VIII through X, maintaining the other stipulations:
2. Prices shall be fixed prices and delivery periods shall always be terms to be observed on penalty of forfeiture of rights, unless otherwise stated.
3. In the event of late delivery, the contracting party shall be immediately in default and shall always owe us a penalty to the amount of the purchase price agreed upon exclusive of VAT, without prejudice to the right to damages to the extent the latter exceed said penalty. The penalty and the damages can be settled against any sum we may owe under any agreement whatsoever.
4. The contracting party shall undertake to give the warranty we are held to give our customers.

XIII Disputes

All disputes between us and the contracting party resulting from any agreement, preliminary agreement or any other legal relationship whatsoever, shall be exclusively referred to the judgement of the competent court in Dordrecht, subject to the absolute competence of the subdistrict sector. The court in Dordrecht, division for interim injunction proceedings, shall be exclusively competent for interim injunctions.

XIV Applicable Law

Dutch law exclusively, shall apply to all offers made and agreements concluded on the present General Terms and Conditions and the consequences thereof. The application of the Vienna Sales Convention shall be excluded.

CE

HISWA

All our products are manufactured according to CE regulations.
We keep the rights to change descriptions, graphs or statements,
which are required for technical development of our Jet Thruster systems.

HOLLAND
MARINE PARTS
WE KEEP YOU MOVING!